AUTOMATIC DIVIDEND REINVESTMENT PLANS
OF NONFINANCIAL CORPORATIONS

By

RODNEY PHIL MALONE

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By

Rodney Phil Malone
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While a feature allowing shareholders to automatically reinvest dividends has long been an option available to shareholders of savings and loan associations, mutual savings banks as well as some mutual funds and life insurance companies, nonfinancial corporations did not begin to provide such options until the late 1960s. The automatic dividend reinvestment (ADR) movement among nonfinancial firms had only a few users until the early 1970s; however, in 1972 and 1973 the movement seemed to pick up considerable momentum. In fact, this study was able to identify 265 nonfinancial corporations that had implemented an automatic dividend reinvestment plan as of October, 1973.

In identifying firms that were ADR users and in gathering information on the cost and mechanics of ADR plans, data were

collected from Fortune's Fifty Largest Commercial Banks. Also, a questionnaire survey was conducted of the Standard and Poor (S&P) 500. Data from the bank survey and questionnaire were presented and analyzed in order to provide information to aid financial executives in deciding whether or not their firm could benefit from implementing an ADR plan. In doing so, profiles of the financial characteristics of firms that already had implemented ADR plans were developed with the aid of stepwise multiple discriminant analysis and statistical hypothesis testing. Profiles of firms that had realized the greatest degree of utilization in terms of shareholder participation were also developed. Multiple regression analysis was used to develop these profiles. Profiles were developed for the S&P 425 industrials and the 55 public utilities in each of the two models. In comparison to nonADR users, firms with established ADR plans were found to have a higher dividend payout ratio and lower growth rates, price earnings ratios, and debt to net worth ratios. Also, there appeared to be a tendency for users to concentrate within a few S&P industrial classifications. Participation rates, on the other hand, appeared to be greater for large firms with higher growth characteristics.

Responses from the survey provided further information from firms that were users and nonusers of ADR plans. Information was gathered from nonusers on the degree of consideration and the probable decision that would be made in regard to whether or not an ADR plan should be established. Firms which indicated that the concept had been rejected, provided information on the reason for rejection. Users provided information such as the reasons for

implementing and the degree of utilization that they had experienced. Also, efforts were made to gauge their reaction to whether or not the ADR experience could have bearing on the firm's dividend policy. In addition, the study sought to ascertain the potential of innovative changes from the traditional type of ADR plan offered such as firm-administered rather than bank-administered plans and the issuance of new shares of common stock through ADR plans rather than purchasing already outstanding issues.

The data from the questionnaire indicated that considerable potential exists for the growth of the traditional type ADR plan which is bank-administered and deals in outstanding issues of common stock. There appeared to be little acceptance to date of firm-administered plans or plans dealing in new issues of common stock.

Finally, the study sought to determine whether or not information gathered from the ADR experience had any applications to dividend theory. In doing so, the models of Miller and Modigliani (M&M) were contrasted with Gordon. Empirical studies were also presented which had bearing upon the question of the "importance" or "unimportance" of the dividend decision in maximizing the value of the firm. In particular, "the clientele theory" of M&M and their assumption of "rationality" on the part of investors were examined. Neither of these premises was found to be contradicted by the ADR experience.

CHAPTER I

INTRODUCTION

In 1967 Allegheny Power System Incorporated implemented an automatic dividend reinvestment (ADR) plan and allowed participating shareholders to apply their dividend checks to the purchase of outstanding shares of the firm's common stock. While dividend reinvestment had long been available to shareholders of mutual funds, savings and loan associations, mutual savings banks and some life insurance companies, Allegheny Power became the first nonfinancial corporation to allow a dividend reinvestment option. In 1969 American Telephone and Telegraph became the first of the corporate giants to provide its shareholders this option. The American Telephone and Telegraph Plan originated when the firm accepted an offer by First National City Bank of New York to act as administrative agent for ADR plans. Since 1969 an increasing number of firms have provided the mechanism for the automatic reinvestment of dividends by shareholders into the common stock of the firm. This study was able to identify 265 nonfinancial firms¹ which, as of October 1973, had established an ADR plan.

As a consequence of the rapid emergence of ADR plans and the lack of adequate information many financial executives may be having difficulty in evaluating answers to questions such as: Why should a dividend reinvestment plan be established? What, in effect, constitutes a suc-

¹The figure was obtained from a questionnaire survey of the Standard and Poor 500 and from correspondence with Fortune's Fifty Largest Banks.

cessful ADR plan? Is there any inherent information in the degree of success realized with an ADR plan that should be considered in making other decisions related to dividend policy?

Purpose of the Study

The purpose of this study is to answer questions of this nature and to draw insights from the birth and growth of the ADR movement by: (1) describing the mechanism of these plans; (2) calculating the cost to participating shareholders; (3) determining the motivation for firm implementation; (4) ascertaining the rationale for shareholder participation; and (5) reviewing implications of the findings from the ADR movement to the theory of corporate dividend policy. Pertinent data (i.e., number of firms, number of shareholders subscribing to the service, the characteristics of firms that have adopted ADR plans, etc.) were collected and analyzed. Based upon the data, the study attempted to determine the effects of ADR plans upon the dividend policy decisions of the firm. Also, profiles were developed of the type of firm which most commonly implements ADR plans as well as the type of firm which realizes the greatest degree of shareholder participation. From the data and subsequent analysis, inferences were drawn as to the consistency of the ADR movement with contemporary dividend practice and theory.

Methodology

Several statistical techniques were employed in analyzing the data generated for the study. Techniques of simple data description were employed to summarize the results to a questionnaire which was

circulated to the Standard and Poor 500.² Two models were developed and tested to determine the respective profiles of firms which do and do not have an established ADR plan as well as profiles of firms which historically have realized the greatest degree of shareholder participation. A test of significance of the difference between two means and multiple discriminant analysis were employed to develop profiles of users and nonusers. Multiple regression analysis was the principal tool utilized for developing profiles of firms with the highest degree of participation.

Many of the required data was obtained from a questionnaire survey and personal communications. The Compustat Tapes provided supplementary data related to the financial characteristics of individual firms. Since the Standard and Poor 500 was selected as the population of firms to be studied, the questionnaire survey was distributed to firms belonging to that population. The more innovative firms, such as American Telephone and Telegraph and Allegheny Power, and Fortune's Fifty Largest Banks³ were contacted individually. The selection and calculation of relevant financial variables taken from the Compustat Tapes will be discussed in detail in the subsequent analysis.

Limitations of the Study

Several procedural problems and shortcomings were encountered in the collection of information and subsequent statistical techniques

²Outlook, "Stocks in the S&P '500' Price Index" (Standard and Poor, January, 1974).

³Fortune, "The Fortune Directory of: The Fifty Largest Commercial Banking Companies" (Vol. LXXXVIII); Time Inc., July, 1973), pp. 120-123.

employed in the study. The fact that a substantial portion of the data came from a questionnaire created concern over response bias. Also the use of Compustat data is subjected to criticism due to the manner in which some data items are defined. Other limitations resulted from defining the population of firms offering ADR plans as the Standard and Poor 500 and the population of banks acting as administrative agents as the Fortune Fifty. Finally, statistical problems were encountered in both the multiple discriminant and the multiple regression models. Multicollinearity was of particular concern in the multiple regression model. Errors in the a priori classification of firms as ADR users and nonusers constituted a potential problem area in the discriminant model.

Organization of the Study

The introduction is followed by Chapter II which summarizes the theoretical and empirical research that has been published on the importance of dividends as a policy decision. In particular, the work of Gordon as well as Miller and Modigliani is presented and contrasted. The third chapter deals with methodology such as the development of the two models as well as the intent and design of the questionnaire. Chapters IV, V and VI contain the empirical results of the study. Multiple discriminant analysis and a test for statistical difference in two sample means were employed in Chapter IV to develop profiles of users and nonusers. Chapter V analyzes the results of the survey of banks and firms. Profiles of firms having high ADR participation rates are presented in Chapter VI. Theoretical implications of the ADR experience are discussed in Chapter VII. The final chapter is a summary.

CHAPTER II

THE NATURE OF DIVIDENDS

Two opposing viewpoints are evident in the financial literature on the theoretical importance of dividends in answer to the question of whether or not there is an optimal dividend policy decision which will maximize the financial worth of the firm. Many scholars in economics and finance have contributed to the controversy. This study will not attempt to present all of the models and equations relevant to the topic. Instead Myron Gordon's model will be contrasted with that of Merton Miller and Franco Modigliani. Then other significant contributions by Walter, Durand, and Lintner will be presented and the statistical findings of several empirical studies will be examined. Finally, a survey will be undertaken to draw upon the observed behavior of the firm in this question of the importance or insignificance of dividend policy in the framework of maximizing the value of the firm.

Early Controversy in the Literature

Early studies and models of the theory of dividends relied heavily upon the concept of present value. Some of these early theorists drew upon the work of John Burr Williams¹ and viewed the worth of the firm as the present value of spinoffs from the investment to the stockholder. Others concluded that earnings were the appropri-

¹John Burr Williams, The Theory of Investment Value (Harvard: The Harvard University Press, 1938).

ate stream to discount in arriving at a market price for the firm. The major area of disagreement between these two rival groups of theorists appeared to be related to the form of shareholder returns, dividends or capital gains, and to timing in an uncertain world. One group whom Lintner² coined "pure earnings" theorists contended that the market value of a firm's common stock is solely a function of earnings and not influenced by dividends. Identified by Lintner as belonging to this group were Durand, the Lutzes, Solomon, Roberts, Kuh, Dean, Weston, Miller and Modigliani. The opposition featured Walter, Gordon, Shapiro, Bierman, Fouraker, Jaedicke, and Lintner. These theorists rallied around Williams' present value formulation. Lintner also called attention to the fact that Williams' work probably drew upon earlier writings of economists such as Irving Fisher, Samuelson, Hicks, Tinbergen, and Preinreich.

One of the earliest theoretical attempts at determination of an optimal dividend policy was established by Walter³ in 1956 with the following equation:

$$(2-1) \quad V_c = \frac{D + \frac{R_a}{R_c} (E - D)}{R_c} = \frac{E}{R_c} + \frac{R_a - R_c}{R_c} (E - D)$$

where D is the cash dividend, E is earnings, R_a is the marginal return on a dollar of investment in the firm, R_c is the market discount rate, and V_c is market value (present value) of the firm's common stock.

According to Van Horne:

² John Lintner, "Dividends, Earnings, Leverage, Stock Prices, and the Supply of Capital to Corporations," Review of Economics and Statistics, XLIV (August, 1962), pp. 243-269.

³ James E. Walter, "Dividend Policies and Common Stock Prices," The Journal of Finance, XI (March, 1956), p. 32.

The Walter formula implies that the optimal dividend payout should be determined solely by the profitability of investments. If the firm has an abundance of profitable investment opportunities, there should be no cash dividends, for the earnings are needed to finance these opportunities. On the other hand, if the firm has no profitable investment opportunities, all earnings should be distributed to stockholders in the form of dividends. In this case, the funds are not needed for financing.

The treatment of dividend policy as a passive residual determined strictly by the availability of acceptable investment proposals implies that dividends are irrelevant; the investor is indifferent between dividends and capital gains. If investment opportunities promise a return greater on the equity-financed portion than the required return, k_e , the investor would prefer to have the company retain earnings. If the return is equal to the required return, he would be indifferent between retention and dividends. Contrary, if the return were less than the required return, he would prefer dividends.⁴

Prior to the contention by Graham and Dodd in their third edition of Security Analysis: Principles and Technique,⁵ that the market price of stock was a function of both earnings and dividends, the predominant view appeared to be that the price of the firm was solely a function of dividends. The assertion by Graham and Dodd was unsubstantiated by empirical analysis; nevertheless, their allegation intensified the controversy that already existed. Several empirical studies were thus stimulated. The "pure earnings" theorists, in particular, Walter, Miller and Modigliani probably reacted in defense to two empirical studies by Durand⁶ and Gordon⁷ in the late 1950s. Both studies employed

⁴James C. Van Horne, Financial Management and Policy (2nd ed.; Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1971), pp. 244-245.

⁵Benjamin Graham and David L. Dodd, Security Analysis: Principles and Technique (3rd ed.; New York: McGraw-Hill Book Co., Inc., 1951), p. 454.

⁶David Durand, Bank Stock Prices and the Bank Capital Problem, Occasional Paper No. 54 (New York: National Bureau of Economic Research, Inc., 1957).

⁷Myron J. Gordon, "Dividends, Earnings, and Stock Prices," Review of Economics and Statistics, XLI (May, 1959), pp. 99-105.

multiple regression analysis of cross-sector data and yielded the conclusion that dividends were a significant factor in influencing the market price of common shares and the value of the firm. In retaliation to the studies and in defense of the position of the "pure earnings" theorists Miller and Modigliani advanced the irrelevance position.⁸ The essence of the argument was not entirely new; among others, Walter,⁹ and the Lutzes¹⁰ had earlier taken a similar stance. The Miller and Modigliani contribution was, however, fully developed and precisely stated. The arbitrage methodology and explicit statement of assumptions along with the element of completeness resulted in an important contribution to valuation theory. The irrelevance position taken by Miller and Modigliani stood in sharp contrast to the position of Gordon and others who opposed the "pure earnings" theorists. Gordon,¹¹ for example, asserted that dividends do matter and that, in general, investors prefer dividends now to capital gains in the future or greater future dividends for the same reason that "a bird in the hand is more valuable than two in the bush." In the Gordon framework dividends increase the value of the firm more than capital gains which result from the reinvestment of earnings. Miller and Modigliani eventually reached the reverse conclusion that if there is any preference

⁸ Merton H. Miller and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," Journal of Business, XXXIV (October, 1961), pp. 411-433.

⁹ Walter, pp. 29-41.

¹⁰ Friedrich August Lutz and Vera Lutz, The Theory of Investment of the Firm (Princeton, N.J.: Princeton University Press, 1951), pp. 213-214.

¹¹ Myron J. Gordon, "Optimal Investment and Financing Policy," The Journal of Finance, XVIII (May, 1963), pp. 264-272.

for dividends or capital gains that preference results only because of tax laws and favors the retention of earnings. The Miller and Modigliani (M&M) arguments and their model will now be presented.

The Miller and Modigliani Model

The initial M&M model made the following three assumptions:

- (1) Rationality - Investors prefer more wealth to less and are indifferent as to the form in which it is received.
- (2) Perfect Capital Markets - Investors have costless and equal access to relevant share information; there are no taxes, no transfer charges, and no single investor can affect the price of a security.
- (3) Perfect Certainty - Not only are the returns on all ventures known, but they are also equal since there is no element of risk where events are predictable.¹²

Under these assumptions the value of the firm at time zero $V(0)$ is the present value of the dividend paid at the end of that period $D(0)$ plus the present value of the price that would be received at the beginning of the next period if the firm were sold $V(1)$. The value of the firm for any time period $V(t)$ is equal to the price of a share of stock in that time period t times the number of shares of common stock outstanding $n(t)$ at the beginning of the period. The following relationship between share price and market value of the firm should hold where k is the appropriate discount rate:

$$(2-2) \quad V(t) = p(t)n(t)$$

$$(2-3) \quad V(0) = \frac{1}{1+k} [D(0) + V(1)].$$

Equation (2-3) holds only if no new shares are issued during the period.

¹²Miller and Modigliani, p. 412.

If new shares are offered at the end of a period, the value must be adjusted for the new shares offered. If $m(t)$ is equal to the new shares offered at the end of period $t-1$, the value of the firm becomes the price of a share times the total shares outstanding. Thus equation (2-2) can be rewritten:

$$(2-4) \quad V(t) = p(t)n(t-1) + p(t)m(t-1)$$

and since

$$(2-5) \quad p(1)n(1) = p(1)n(0) + p(1)m(0)$$

equation (2-3) could then be restated:

$$(2-6) \quad V(0) = \frac{1}{1+k} [D(0) + p(1)n(1) - m(0)p(1)]$$

leaving:

$$(2-7) \quad V(0) = \frac{1}{1+k} [D(0) + V(1) - p(1)m(0)].$$

Equation (2-7) simply states that value is the present worth of dividends and capital gains. It also differentiates between the value of the firm to all shareholders $V(1)$ and the value to new shareholders $p(1)m(0)$. The difference, $V(1) - p(1)m(0)$, is of course the value that is attributable to shareholders from the previous period.

The net effect of equation (2-7) is to show that the value of the firm in period t is affected only through the dividend in period t and is independent of the dividend in periods beyond t . M&M then develop an arbitrage argument based upon a given investment for two firms identical in all respects except for dividend policies. If a firm is trying to maintain a given investment level $I(t)$, then the greater the dividend $D(t)$ the greater the amount of new shares $m(t+1)$ that must be issued. The question is then, "Does the increased dividend $D(t)$ more than offset the loss in value that results from issuing $m(t+1)$ new shares of

common stock?" If $X(t)$ is the income generated by the firm in period t , the retention of earnings for investment by the firm is income minus the dividend or $X(t) - D(t)$. Provided that investment is at least as great as retention, then new stock sales must account for any difference between investment and retention. This relationship is depicted by the following equation:

$$(2-8) \quad I(t) - (x(t) - D(t)) = p(t+1)m(t).$$

That is, investment minus retention equal new stock financing required to maintain the desired level of investment $I(t)$. Substituting in equation (2-7) the following results:

$$(2-9) \quad V(0) = \frac{1}{1+k} [D(0) + V(1) - I(0) + X(0) - D(0)]$$

simplifying:

$$(2-10) \quad V(0) = \frac{1}{1+k} [V(1) - I(0) + X(0)]$$

and the general form of the equation becomes:

$$(2-11) \quad V(t) = \frac{1}{1+k} [V(t+1) - I(t) + X(t)].$$

Since all of these terms are independent of dividend policy, the value of the firms, $V(t)$, is independent of present dividend policy. What about future dividend policy? That is, "Can $D(t+1)$ affect the present value of the firm?" The answer is apparent when equation (2-11) is solved for the value of the firm in period $t+1$ since dividends must affect $V(t+1)$ in order to affect $V(t)$. This reformulation is as follows:

$$(2-12) \quad V(t+1) = \frac{1}{1+k} [V(t+2) - I(t+1) + X(t+1)].$$

Consequently, dividend policy in period $t+1$ has no affect upon the value of the firm in that period, and future dividend policy can exert no influence except through the value of the firm in period $t+2$.

Equation (2-11) can likewise be reformulated to show that the value of the firm in all future periods is independent of dividend policy in that period. Of course, M&M's results are only valid when the assumptions of their model are realistic. In essence, the results stem from the assumption of a given level of investment $I(t)$. In maintaining that level of investment at any time, the firm that paid a dividend found it necessary to sell additional shares of stock. The new shareholders now own that share of the firm that was distributed as dividends. The old shareholders received a dividend that was of value to them but lost a share of ownership in the firm equal to the assets distributed to pay the dividends. The result is that the total value of the firm to old shareholders, $V(t)$, is independent of the firm's dividend policy.

Now M&M relax the initial assumption of uncertainty and allow variables to be random elements. They assume that the firm has no debt in its capital structure and that dividends do not operate in a bayesian sense of providing additional information about either dividends or earnings in future time periods. By considering the effect of dividend policy upon the value of two firms which are identical in all respects except for dividend policy, M&M are able to reach the same conclusion they did in a world of certainty. The assumption of a given investment policy is once again paramount. To account for the fact that there are two firms, each variable will now have a double subscript. The first subscript j will denote the particular firm and the second subscript t will again denote the period of time. Equation (2-11) can be reformulated to differentiate between the two firms as follows:

$$(2-13) \quad V(jt) = \frac{1}{1+k} [V(jt+1) - I(jt) + X(jt)].$$

The assumptions imply in an uncertain world (with $\circ$ denoting uncertainty) that:

$$(2-14) \quad \overset{\circ}{X}(1t) = \overset{\circ}{X}(2t) \text{ for all } t$$

$$(2-15) \quad \overset{\circ}{I}(1t) = \overset{\circ}{I}(2t) \text{ for all } t.$$

That is, investments and income are random variables and are the same for both firms. M&M then allow one of the firms to pay all its earnings out as dividends the first period; otherwise, the two firms will have the same dividend policy in all future periods (n).

$$(2-16) \quad \overset{\circ}{D}(1t) = \overset{\circ}{D}(2t) \text{ for all } t \text{ except } t = 0.$$

Thus, from the end of period 0 to n , the firms are identical in all respects. The total return for present shareholders of firm j at the end of period t is also a random variable $\overset{\circ}{R}(jt)$. Also this return variable, though random, is comparable to $V(jt)$ in (2-13) except $\overset{\circ}{R}$ is used to denote an anticipated return to current shareholders. Equation (2-13) thus becomes:

$$(2-17) \quad \overset{\circ}{R}(jt) = \frac{1}{1+k} [\overset{\circ}{V}(jt+1) - \overset{\circ}{I}(jt) + \overset{\circ}{X}(jt)].$$

Solving for period zero for both firms:

$$(2-18a) \quad \overset{\circ}{R}1(0) = \overset{\circ}{V}1(1) - \overset{\circ}{I}1(0) + \overset{\circ}{X}1(0)$$

$$(2-18b) \quad \overset{\circ}{R}2(0) = \overset{\circ}{V}2(0) - \overset{\circ}{I}2(0) + \overset{\circ}{X}2(0).$$

Equations (2-14) and (2-15) have already established the fact that the investment and income for the two firms are identical by assumption. Since after the first period the two firms are identical in all respects then:

$$(2-19) \quad \overset{\circ}{V}1(1) = \overset{\circ}{V}2(1)$$

and:

$$(2-20) \quad \overset{\circ}{R}1(0) = \overset{\circ}{R}2(0).$$

With wealth or gross return for the two firms identical after the first period, the value of equation (2-17) is equal for both and is independent of dividend policy in all future periods. Thus both firms should command the same price in a rational market. A recursive proof is also applicable when the dividend policy is allowed to differ in periods beyond time zero. The conclusion is still that dividends do not matter even when the assumption of certainty is relaxed.

Of course with the valuation model developed by M&M¹³ to prove that the cost of capital is independent of capital structure, the inclusion of debt into the dividend framework presents no special problem. Since the cost of capital is independent of capital structure, it is irrelevant within the M&M framework whether debt or stock sales are used to finance investments necessitated by paying dividends.

Several potential shortcomings may exist with the M&M model. One argument is that dividends may provide additional information in a bayesian context about future dividends and earnings. In this framework $\hat{D}(t)$ provides information about $\hat{V}(t+1)$ which in turn affects $\hat{V}(t)$. Secondly, M&M assume away brokerage fees and reason that if an individual has a preference for dividends, he need only sell enough shares of his stock to satisfy that preference. Likewise an investor preferring capital gains could simply reinvest the dividend. Even if brokerage fees, etc. may prevent such activity, M&M contend that it is still possible that the market behavior might be little different than it would be in absence of all transfer charges. M&M argue:

¹³Franco Modigliani and Merton H. Miller, "The Cost of Capital, Corporation Finance, and The Theory of Investment," American Economic Review, XLVIII (June, 1958), pp. 261-297.

If, for example, the frequency distribution of corporate-payout ratios happens to correspond exactly with the distribution of investor preferences for payout ratios, then the existence of these preferences would clearly lead ultimately to a situation whose implications were different in no fundamental respect from the perfect market case. Each corporation would tend to attract to itself a "clientele" consisting of those preferring its particular payout ratio, but one clientele would be entirely as good as another in terms of the valuation it would imply for the firm.¹⁴

Taxes may constitute another problem area for the M&M model. The irrelevance argument assumed no taxes. The problem area is not the mere existence of taxes but the existing differential between taxes on personal income (dividend income) and capital gains. M&M admit that the existence of taxes or at least the differential creates some problems for them and, in fact, concede that shareholders may have a preference for income from capital gains over dividend income because of the lower tax rate that some investors may pay on capital gains. Also the rationality assumption may not be valid and people may not be wealth maximizers. Finally, the assumption of a given investment policy is not consistent with the advocates of the residual theory of dividends¹⁵ who claim that the market value of the firm is maximized when the capital budgeting expenditure, optimal capital structure and dividend policy are simultaneously determined.

In essence, M&M argue that either the assumptions that they made are valid or that the market behaves in such a manner that the effects are not altered. Thus, with the exception of the tax criticism, the irrelevance position is valid and investors are indifferent between

¹⁴Miller and Modigliani, p. 431.

¹⁵Advocates of the residual theory of dividends include Weston and Brigham as well as Lintner.

dividend income and capital gains. There is no optimal dividend policy for the firms just as there is no optimal financial policy. When taxes are considered, investors should exert a preference for capital gains.

The Gordon Model

Gordon¹⁶ presents a slightly different model from M&M. He makes two critical assumptions and draws upon valuation models which discount cash flows. The basic assumptions are that individuals are risk averse and that risk increases over time. Working under conditions of uncertainty, Gordon equates the price of a share of stock, P_0 , to the present value of its future dividend spinoffs.

$$(2-21) \quad P_0 = \frac{Y_0}{1+k} + \frac{Y_0}{(1+k)^2} + \frac{Y_0}{(1+k)^3} + \dots + \frac{Y_0}{(1+k)^n}$$

In effect, Gordon assumes that if no additional investments are made beyond asset replacements that the firm will earn the same return, Y_0 , in all future periods. If a corporation elects to retain a portion of its dividend equal to Y_0 at time zero, then that firm will pay no dividend at the end of the zero period. Instead, the investment of Y_0 will yield a return in all future periods. In the Gordon model, k is not only the discount rate but it is also the return that investors require on a share of stock. If the reinvested earnings are expected to yield a return of $k = Y_0/P_0$, the resulting valuation equation takes the following form:

$$(2-22) \quad P_0 = \frac{0}{1+k} + \frac{Y_0 + kY_0}{(1+k)^2} + \frac{Y_0 + kY_0}{(1+k)^3} + \dots + \frac{Y_0 + kY_0}{(1+k)^n} .$$

Simplifying one gets:

¹⁶Gordon, "Optimal Investment and Financing Policy," pp. 264-272.

$$(2-23) \quad P_0 = \frac{kY_0}{(1+k)^2} \left[1 + \frac{1}{1+k} + \frac{1}{(1+k)^2} + \dots + \frac{1}{(1+k)^n} \right] + \frac{Y_0}{(1+k)^2} + \frac{Y_0}{(1+k)^3} + \dots + \frac{Y_0}{(1+k)^n}.$$

Since:

$$(2-24) \quad \frac{kY_0}{(1+k)^2} \left[1 + \frac{1}{1+k} + \frac{1}{(1+k)^2} + \dots + \frac{1}{(1+k)^n} \right] = \frac{Y_0}{1+k}$$

then:

$$(2-25) \quad P_0 = \frac{Y_0}{(1+k)} + \frac{Y_0}{(1+k)^2} + \frac{Y_0}{(1+k)^3} + \dots + \frac{Y_0}{(1+k)^n}.$$

Therefore, equation (2-21) is equal to equation (2-22) and the value of the firm is unaffected by the retention of earnings. The present value of the dividend forgone is exactly offset by the present value of increased future dividends resulting from the additional investment in period zero. Gordon now takes issue with the policy of using a constant discount rate in the valuation framework. Instead he offers the premise that individuals may tend to discount the increased dividend resulting from earnings retention at a higher rate than the dividend that would have been paid otherwise, Y_0 . Therefore, he adjusts equation (2-22) in such a manner that the incremental dividend resulting from earnings retention is discounted at k' with k' being a greater discount rate than k . The following equation results:

$$(2-26) \quad P_0^1 = \frac{Y_0}{(1+k)^2} + \frac{Y_0}{(1+k)^3} + \dots + \frac{Y_0}{(1+k)^n} + \frac{kY_0}{(1+k')^2} + \frac{kY_0}{(1+k')^3} + \dots + \frac{kY_0}{(1+k')^n}.$$

Simplifying:

$$(2-27) \quad P_0^1 = \frac{kY_0}{(1+k')^2} \left[1 + \frac{1}{1+k'} + \frac{1}{(1+k')^2} + \dots + \frac{1}{(1+k')^n} \right] + \frac{Y_0}{(1+k)^2} + \frac{Y_0}{(1+k)^3} + \dots + \frac{Y_0}{(1+k)^n}.$$

And since:

$$(2-28) \quad \frac{kY_o}{(1+k')^2} [1 + \frac{1}{1+k'} + \frac{1}{(1+k')^2} + \dots + \frac{1}{(1+k')^n}] = \frac{kY_o}{k'(1+k')}.$$

Therefore:

$$(2-29) \quad \frac{kY_o}{k'(1+k')} < \frac{Y_o}{1+k}.$$

Then Po' is less than Po . That is, the present value of the future cash flows for a firm which retained earnings and reinvested those earnings at such a rate as to earn the required rate of return, k , would be less than that for an otherwise identical firm that paid out a dividend Y_o in the initial period. Gordon admits, however, that he can not verify that investors require a higher return on reinvested earnings. Instead, he offers the possibility that investors' discount rates increase with time with $k_1 < k_2 < k_3 < \dots < k_n$. Gordon's rationale is that the greater the lapse of time between investment and receipt the greater the risk involved with a venture; therefore, the higher the discount rate should be. Equation (2-21) thus modified becomes:

$$(2-30) \quad Po = \frac{Y_o}{1+k_1} + \frac{Y_o}{(1+k_2)^2} + \frac{Y_o}{(1+k_3)^3} + \dots + \frac{Y_o}{(1+k_n)^n}.$$

Gordon concludes that the k in equation (2-21) could be a weighted average of k_t 's in equation (2-30) with the weights being determined by the cash flows in the respective periods. Now if the dividend is retained in the initial period the following represents the present value of the firm:

$$(2-31) \quad Po' = \frac{Y_o + kY_o}{(1+k_2)^2} + \frac{Y_o + kY_o}{(1+k_3)^3} + \dots + \frac{Y_o + kY_o}{(1+k_n)^n}.$$

However, if k' is the weighted average of all the k_t 's then equation (2-31) is equal to equation (2-26). Likewise it can be shown that k' is greater than k . Therefore, Po in equation (2-30) is greater than Po' in

equation (2-31). The results indicate that investors value the paying out of earnings in dividends more than the retention of earnings.

A few assumptions of the Gordon model have been questioned. Perhaps the most important problem area is that he assumed no taxes. In particular, the tax differential between the rate that individuals may have to pay on capital gains and dividend income may negate his conclusion in a world of taxes. Also his resolution of uncertainty by increasing the discount rate when dividends are retained and reinvested, while generally accepted, may still be questioned.

The unfortunate fact is that the Gordon and M&M models are incomparable on purely theoretical grounds. That is, Gordon and the irrelevance position are not talking about the same case. M&M assumed a given investment policy; Gordon did not. Also Gordon did not provide for the possibility of an investor selling a portion of his stock. The inability to compare the two models because of conflicting assumptions encouraged studies which sought to uncover the pragmatic importance of dividend policy.

In summary, studies supporting Gordon have verified the importance of dividends in regression models. Contrary studies in support of the irrelevance position have shown evidence of the existence of a clientele effect or have presented a case for retention of earnings due to the existence of a tax advantage of incomes from capital gains over dividend income. Neither side has conceded the argument.

Empirical Studies

The empirical studies attempting to test the various positions on valuation with respect to earnings and dividends can be classified into

two categories. First, there are the multiple regression studies from the late 1950s through the 1960s. The bulk of evidence from these studies is at best circumstantial due to inherent statistical problems. The second group of studies is a very diverse collection of data which attempts to determine the incidence of tax policy, the existence of clienteles, the propensities of firms to pay out dividends, and the projection of a dividend payout ratio for a firm from historical and financial data. The evidence presented by this group is probably the stronger; yet, the total information provided by all empirical studies may well be inconclusive.

Early Regression Models

In surveying the first group of empirical studies, three multiple regression models by Durand,¹⁷ Gordon,¹⁸ and Brigham and Gordon¹⁹ will be presented. The statistical problems of multiple regression analysis as applied to the valuation controversy will be discussed.

The Durand model

Durand's model was concerned with explanation of share valuation in terms of financial variables. The particular variables that he chose were the book value per share, B, earnings per share, E, and the dividend payout ratio, D/E. The particular function that he chose was the log linear function that follows:

$$(2-32) \quad P = \log(a) + b_1 \log(B) + b_2 \log(E) + b_3 \log(D/E).$$

¹⁷Durand, pp. 52-59.

¹⁸Gordon, "Dividends, Earnings, and Stock Prices," pp. 99-105.

¹⁹Eugene F. Brigham and Myron J. Gordon, "Leverage, Dividend Policy, and the Cost of Capital," Journal of Finance, XXIII (March, 1968), pp. 85-104.

That is, share price, P , is a log linear function of a constant, book value per share, earnings per share and the dividend payout ratio.

Durand then tested the statistical significance of adding the dividend payout ratio variable to an equation in which that one variable had been omitted. He found that the addition of the dividend payout ratio to an equation in which price was a log-linear function of a constant, book value per share, and earnings per share was significant at the .01 level when an F-test was performed on the entering variable. He concluded that prices are influenced by dividends.

The Gordon model

Gordon's empirical study in the late 1950s was based upon a cross-section of the Chemical, Foods, Steel, and Machine Tools industries for the years 1951 and 1954. In essence, the study was a multiple regression model of three hypotheses and two equations. Gordon contended that there were three plausible hypotheses for the valuation of the common stock of a firm. The first he associated with the statement by Graham and Dodd that stock prices were, in fact, a function of both dividends and earnings. The second was the position which he supported and which had evolved from the earlier work of John Burr Williams, that price was solely determined by dividends. The third represented the position of the "pure earnings" theorists. To test the Graham and Dodd contention, Gordon considered the following equation appropriate:

$$(2-33) \quad P = a_0 + a_1 D + a_2 Y$$

where P is the year-end share price, D is the annual dividend, and Y is annual income. To test the second hypothesis Gordon advanced the equation that price was a function of dividends and retained earnings ($Y-D$)

which he considered a surrogate for growth. That equation was:

$$(2-34) \quad P = a_0 + a_1 D + a_2 (Y-D).$$

It should be noted that the two equations will give identical coefficients of determination. This is more apparent when equation (2-33) is rewritten as follows:

$$(2-35) \quad P = a_0 + a_1 D + a_2 (Y-D) + a_2 D.$$

That is, the a_1 in equation (2-34) will be equal to the sum of $a_1 + a_2$ in equation (2-33). In either case the regression coefficients of a_0 and a_2 will be the same for equations (2-33) and (2-34). Gordon felt that some of the signs were wrong for equation (2-33) and was disturbed by the fact that the change between the two years in regression coefficients for the same industry was sometimes drastic. Consequently, he believed that equation (2-34) probably was more appropriate. In addition, he reasoned that equation (2-34) not only supported his position but also failed to support that of the "pure earnings" theorists. The evidence that Gordon cited here was that the coefficient for equation (2-34) was greater for D than for $(Y-D)$. His logic was that dividends play a greater role in the price mechanism than growth (i.e., earnings).

The Brigham and Gordon model

The Miller and Modigliani²⁰ study of the electrical utilities industry was published in 1966. The empirical study concluded that dividends had a negligible effect upon share prices for the electrical utility sector in the 1954-1957 period. Perhaps in response to the M&M conclusions, Brigham and Gordon's cross-section multiple regression

²⁰Merton H. Miller and Franco Modigliani, "Some Estimates of the Cost of Capital to the Electric Utility Industry," American Economic Review, LVI (June, 1966), pp. 333-391.

study of the electrical utilities industry was published in 1968. The findings of the latter were inconsistent with the "pure earnings" theorists. The principal equation fitted by their study was:

$$(2-36) \quad \frac{D_0}{P_0} = a_0 + a_1 g.$$

That is, the current dividend per share divided by current market price per share is a function of a constant and the historical growth rate of retained earnings. Brigham and Gordon subsequently added additional explanatory variables in order to reduce specification bias and to test for other effects such as leverage. To interpret the findings of the regression analysis one only needs to recall that the present value of a stock with a constant growth rate in the Williams' evaluation model²¹ reduces to:

$$(2-37) \quad P_0 = \frac{D_0}{k_e - g}.$$

Equation (2-37) simply states that share price is equal to the dividend per share divided by the difference between the discount rate applied to equity stream, k_e and the growth rate. Solving for D_0/P_0 or the dividend yield the equation becomes:

$$(2-38) \quad \frac{D_0}{P_0} = k_e - g.$$

Brigham and Gordon use br the product of the retention rate (b) and the rate of return on equity investment (r) as a surrogate for growth so:

$$(2-39) \quad g = br.$$

Consequently, they note that if a_1 is equal to -1 then k is unaffected by dividend policy and, in effect, the investor is indifferent between dividends and capital gains or growth. Otherwise, the investor has a

²¹Williams, p. 88.

preference for either dividends or growth. If a_1 is greater than -1 then investors have a preference for dividends over capital gains. If a_1 is less than -1 the reverse is true. In most of their linear models with from two to five additional explanatory variables added for the reasons described previously, the coefficient for a_1 ranged from about -.5 to -.2. Brigham and Gordon interpret this as evidence of the importance of dividends as a policy decision.

Critique of Regression Models

In a 1964 article Irwin Friend and Marshall Puckett²² dealt extensively with statistical problems in multiple regression valuation equations, in general, and the findings of Gordon and Durand, in particular. In essence, five distinguishable problems were presented in their study.

Seemingly the most serious is that of omitted variables or specification bias. In regard to conclusions such as those reached by Gordon from equations similar to (2-34), Friend and Puckett took issue. Two possible omissions troubled the two researchers. The more critical was perhaps the omission of an appropriate risk variable. For example, if the price of stock is an inverse function of risk and high risk firms, out of concern for maintaining their dividends over time, tend to pay smaller dividends than comparable low risk firms, then the coefficient of the dividend variable will be biased upward in equation (2-34). What appears to show that dividends are more prominent in valuation of shares than retention may be simply the fact that more risky shares do not command the same market price as low risk shares.

²²Irwin Friend and Marshall Puckett, "Dividends and Stock Prices," American Economic Review, LIV (September, 1964), pp. 656-682.

Also Friend and Puckett were reluctant to concede that growth is determined exclusively by retention of earnings. Additional specification bias may result from the omission of a growth variable although the direction of the bias was viewed as indeterminant by the study.

Regression weights may constitute another trouble area for multiple regression studies. Each observation's contribution to the final equation is relative to the deviation from the average of that observation for each variable. As a result, extreme values have a greater relative contribution than values which cluster around the mean. If it is evident that high and low quality stocks exhibit high and low dividend payouts respectively, then the regression coefficient of dividends in equation (2-34) may exhibit an upward bias.

A third potential problem may exist if investors consider part of the fluctuation in earnings as random. Since dividends fluctuate considerably less than earnings then multiple regression analysis would tend to attribute greater prominence to the dividend variable and less to the earning variable.

An additional area of concern may be the fact that dividend figures can be precisely measured and earnings figures can not. A downward bias in retention of earnings may also be present in equation (2-34) in relation to the dividend variable. As a result, the earnings figure reported is not the appropriate figure that investors consider due to accounting principles that necessitate adjustment in earnings figures before meaningful earning figures are obtainable.

Finally, what Friend and Puckett identify as a least-squares bias may exist. That is, causation is assumed to run from dividends to the price. However, if investor and management expectations are not

comparable then the price of shares may influence management's decision to pay dividends. This bias would also be upward for the dividend variable.

It would appear that the Brigham-Gordon regression model sought to minimize the shortcomings pointed out by the Friend and Puckett study. The mere fact that the electrical utilities industry was selected probably minimized the specification bias of omitting a risk variable and failure to take account of growth not influenced by retention. For one thing, risk and growth rates within that particular industry do not vary greatly from firm to firm as one would have expected in the Gordon study. Even earnings exhibit a greater stability. The Brigham-Gordon study did create some new statistical problems when additional variables such as debt to net worth were added to equation (2-36). While, in fact, this study probably has fewer serious statistical problems than the studies by Gordon and Durand, it may well have more minor problems because of the intercorrelation among independent variables which were added to reduce specification bias. At any rate, statistical shortcomings make the evidence seem less conclusive than the figures would otherwise seem to indicate.

Other Empirical Studies

Edwin J. Elton and Martin J. Gruber²³ sought to provide empirical substantiation of the "clienteles effect" and "rationality" by studying marginal stockholder tax rates. To test the hypothesis that the marginal tax rate of marginal investors decreased as the dividend pay-

²³Edwin J. Elton and Martin J. Gruber, "Marginal Stockholder Tax Rates and the Clientele Effect," Review of Economics and Statistics, LII (February, 1970), pp. 68-74.

out ratio increased, the study focused on equilibrium price movements in share prices between prices on stock sold with the dividend and that same share sold ex-dividend one day later. If P_a is the price of a share sold ex-dividend, P_b is the price of a share sold with dividends on the day before that share goes ex-dividend, P_c is the price at which the stock was purchased, t_o is the tax rate on dividend income, t_c is the tax rate on capital gains, and D is the amount of the dividend, then the following equation dictates an equilibrium situation:

$$(2-40) \quad \frac{P_b - P_a}{D} = \frac{1 - t_o}{1 - t_c} .$$

In equilibrium the investor at the margin will be indifferent between the after-tax wealth he receives from selling the stock or not selling. That is:

$$(2-41) \quad P_b - t_c(P_b - P_c) = P_a - t_c(P_a - P_c) + D(1 - t_o) .$$

Elton and Gruber, consequently, used $(P_b - P_a)/D$ as a surrogate for the marginal tax bracket of marginal investors. To test the hypothesis, the study utilized closing prices on stocks on the New York Stock Exchange traded on the ex-dividend and the previous day. Using a Spearman rank correlation coefficient to discern if there was a relationship between the surrogate for the marginal tax rate and both the dividend yield and the dividend payout ratio, the results were reported to be significant at the .01 level and positive. Elton and Gruber concluded that the statistical evidence supported the clientele effect of Miller and Modigliani and provided some evidence of market rationality in that shareholders in higher income tax brackets preferred capital gains to dividend income. The researchers admitted a few statistical problems. They seemed particularly concerned about the

bias that could result from the use of dividends as the denominator of the dependent variable and the numerator of the independent variable. Perhaps there is cause for concern. Yet it is indeed questionable whether the findings should be totally invalidated by the presence of spurious correlation between the independent and dependent variable. Additional empirical studies of marginal tax rates of investors were made by Weston and Brigham,²⁴ Holland,²⁵ and Jolivet.²⁶ The Elton and Gruber estimate of the marginal tax rate was about 36 percent; whereas, the respective estimates of the others were 46, 55.6, and 39 percent. While there is some disagreement due to differences of measurement techniques and to the fact that the studies were conducted over a span of some twenty years,²⁷ the argument remains that, after the basic dividend exemption, the marginal tax rate on dividends is greater than the rate applied to capital gains.

Another strong case for retention of earnings is evident if the following statement by West and Bierman predominates:

²⁴J. Fred Weston and Eugene F. Brigham, Managerial Finance (2nd ed.; New York: Holt, Rinehart and Winston, 1966), p. 309.

²⁵Daniel M. Holland, Dividends Under the Income Tax (New York: National Bureau of Economic Research, 1962), p. 120.

²⁶Vincent Jolivet, "The Weighted Average Marginal Tax Rate on Dividends Received by Individuals in the U.S.," American Economic Review, LVI (June, 1966), pp. 473-477.

²⁷Jolivet attempted to determine the marginal tax rate from historical tax returns for 1961 and 1962. Weston and Brigham weighted the marginal tax rates of dividend recipients. The weights were calculated according to the total dollar dividends received by shareholders in each tax bracket. The Weston and Brigham study was for 1965. Holland's figure was a weighted average marginal tax rate on dividends received by individuals for 1952. The Elton and Gruber study was based on April 1, 1966 to March 31, 1967 data in the manner previously described.

Dividend policy merely influences the magnitude and timing of the shareholders' tax payments. In particular, decreases in present dividends tend to reduce and put off the payment of taxes Under uncertainty, this case is, if anything, strengthened: a decrease in dividends results in a known reduction in current tax payments which is only partially offset by a smaller increase in the present value of a less certain future tax liability.²⁸

Baumol also made an interesting refutation of a statement to a declaration by Miller and Modigliani that in the long run one clientele would prove equally as beneficial to the valuation process as another for the firm. Baumol concluded:

As is the case with any potential supplier of a differentiated product, good product design strategy consists in looking for segments of the market whose wants are relatively poorly supplied, and in turning out a product calculated to satisfy these desires, for such a product will command a price which is comparatively high in relation to those which serve the more saturated segments of the market. Thus, choice of dividend policy may well be a matter of considerable moment for the corporation, one that merits most careful consideration and planning, and for which optimality calculations are of the utmost relevance.²⁹

No empirical evidence is cited in support of the above statement. Theoretically, the existence of overabundance in a segmented market would seem to violate the assumptions of rationality and perfect markets by Miller and Modigliani. Pragmatically, the existence of such conditions may be cause for concern to the firm if there is any way of discerning them.

Another argument directed against the "pure earnings" theorists is offered by Lintner.³⁰ The focus of his argument is that firms in the M&M model who are forced to enter the market in order to pay divi-

²⁸Richard R. West and Harold Bierman, Jr., "Corporate Dividend Policy and Pre-emptive Security Issues," Journal of Business, XLII (January, 1968), p. 75.

²⁹William J. Baumol, "On Dividend Policy and Market Imperfection," Journal of Business, XXXVI (January, 1963), p. 115.

³⁰John Lintner, pp. 256-259.

dends and still meet a given investment level may find that they have downward sloping demand curves for their common stock. When underpricing of this nature exists it will be necessary for firms to sell a greater number of shares to replace the distribution of earnings to the shareholder. Consequently, present stockholders would be better off if earnings were retained and the market price of the shares were maintained and not depressed by stock issues. Theoretically, this is a violation of the assumption of perfect capital markets. On this matter Friend and Puckett surmise:

We do not normally witness perceptible drops in the market price level when the aggregate supply of corporate stock is increased by new issues, requiring for their absorption the substitution of current for future income and potentially raising the risk premium demanded by investors; nor do we typically witness sharp drops in the per-share price when the supply of an individual company's shares is increased. It is possible to infer of course that these increases in supply are precisely timed so as to be automatically offset by upward shifts in investor expectations, but this seems completely unrealistic.³¹

Other empirical studies took the alternate approach of looking at what firms are doing and inferring that the behavior of those firms should approach optimality. One such study was advanced by Lintner³² in the late 1950s. The basic equation utilized multiple regression and was of the following form:

$$(2-42) \quad D_{it} = a_{it} + b_1 P_{it} + b_2 D_{i(t-1)} + u_{it} .$$

The dividends of firm (i) in period (t) were then regressed against a constant, in period t, and dividends in the previous period. An error term u_{it} for the ith firm in period t was also included. Lintner's

³¹Friend and Puckett, p. 659.

³²John Lintner, "Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes," American Economic Review, XLVI (May, 1956), pp. 97-113.

contention was that the firm behaves very conservatively and is reluctant to raise its dividend payment until it is reasonably sure that the increase dividend level can be maintained. More precisely, there is a substantial degree of inertia or resistance to departure from what is apparently considered an optimal dividend payment. Reformulation of equation (2-42) for a particular firm reveals:

$$(2-43) \quad D_t - D_{t-1} = a_t + c(rP_t - D_{t-1}) + u_t .$$

Brittain offers an excellent interpretation of this equation. He concludes that:

Corporations were pictured as pursuing a "target" payout ratio r which they apply to current earnings $[P_{t-1}]$. If dividends were fully adjusted each year to achieve the target level $[rP_t]$, they would be changed by $[rP_t - D_{t-1}]$ between times $t-1$ and t . However, a conservative bias against large revision leads them to move only a fraction of the way, given by the speed of adjustment coefficient c . The constant term a -- expected to be positive -- was added to allow for a presumed greater reluctance to cut dividends than to raise them. If a is positive, the model says that dividends will tend to drift up even if the rest of the model calls for no change. Thus, the target level of D must be enough below D_{t-1} to offset the constant term in order for a cut in dividends to be indicated.³³

Lintner tested equation (2-43) by fitting it to 1946-1954 data of American Corporations. Brittain³⁴ showed that the predictive power of the Lintner model could be increased with the substitution of cash flow for profits.

Keith Smith,³⁵ in an effort to test for the empirical existence of a in equation (2-43), studied the "increasing stream" hypothesis.

³³John A. Brittain, Corporate Dividend Policy (Washington, D.C.: The Brookings Institution, 1966), p. 19.

³⁴Ibid., p. 52-73.

³⁵Keith V. Smith, "Increasing Stream Hypothesis of Corporate Dividend Policy," California Management Review, XIV (Fall, 1971), pp. 56-64.

Smith's statement of that hypothesis is perhaps best illustrated by his following assertion:

The increasing stream hypothesis of corporate dividend policy is that the board of directors deliberately avoids dividend cuts if at all possible and attempts to construct over time an increasing, or at least a nondecreasing, record of cash dividend payments.³⁶

Working with a large sample of firms from the Standard and Poor's Compustat Service, Smith found that a large number of firms did not cut dividends during the 1949 to 1966 period. He also classified firms according to the number of consecutive years that dividends had been increased and noted that the majority of firms had increased dividends over a number of years. His evidence would seem to present some strong empirical support of the reluctance to decrease the dividend level. One criticism is that it is a very short-run approach and fails to signal or explain drastic alterations in dividend payments which do occur from time to time.

A more recent and probably more pragmatic study is one by Edwin P. Harkins and Francis J. Walsh, Jr.³⁷ The study was a survey of financial executives of 166 firms. Of the 155 responses to a question as to which is more important cash flows or net income in determination of dividends, 70 felt the two were equally important, 57 felt that net income was more important, and 28 felt that cash flow was more important.³⁸ The figures would not seem to substantiate Brittain's refinement of Lintner's regression equation (2-43). Also of interest are frequency

³⁶Ibid., p. 57.

³⁷Edwin P. Harkins and Francis J. Walsh, Jr., Dividend Policies and Practices (New York: The Conference Board, Inc., 1971), pp. 1-27.

³⁸Ibid., p. 10.

of response tabulations to a question designed to reveal the considerations that influence boards of directors in making dividend decisions. A partial list of the most important items in that study is presented in Table I:

TABLE I
FREQUENCY OF RESPONSES OF EXECUTIVES
TO FACTORS INFLUENCING DIVIDEND POLICY*

Response	Frequency
Earnings record and future prospect	94
Continuity or regularity of dividend payment	76
Stability of rate per share	47
Cash flow, position and future needs	44

*Edwin P. Harkins and Francis J. Walsh, Jr., Dividend Policies and Practices (New York: The Conference Board, Inc., 1971), p. 4.

This information would seem to contain support for conflicting viewpoints on the question of dividend policy. The second and third responses would seem to support Lintner's contention of an "inertia", a positive value for the constant, a , in equation (2-43), and the speed of adjustment coefficient. The first response would seem to substantiate the "pure earnings" theorists. Yet the addition of "future prospect" makes this more uncertain. In fact the "pure earnings" theorists themselves are divided over whether historical earnings or expected earnings is the appropriate value to discount in valuation models. Miller and Modigliani use expected earnings. It is possible that the frequency response might have been quite different if the two

concepts had been differentiated. Of course, one could argue that future prospects are quite likely to be a projection of historical earnings. This may be true. However, there is a possibility that "future prospect" includes a subjective consideration of the capital budgeting outlook. If so, then perhaps proponents of the residual theory have some indirect support. The fourth response directly supports Brittain's substitution of cash flow for net income. On the surface it would appear that the first response contradicts this same suggestion. Indirectly, the fourth response may support the residual dividend policy if future need includes capital budgeting considerations. And to the extent that cash flow and earnings do not move in harmony, the position of the "pure earnings" theorists is weakened.

Summary

Empirical studies and a few arguments with little or no supporting data have been advanced to settle the argument between the "pure earnings" theorists and followers of John Burr Williams who insist that dividends are the appropriate stream to discount. In particular, empirical evidence of varying degrees of merit and reliability has been presented in support of the positions of Miller and Modigliani as well as Gordon. The preponderance of the empirical evidence supports the conclusion of neither, in that Miller and Modigliani advocated no dividends for income tax reasons and Gordon advocated no retention due to the higher discount rate associated with uncertainty that is applied when dividends are withheld. Perhaps the most overwhelming evidence is the simple observation that very few firms pay either all or no dividends. The study of Harkins and Walsh found the majority of firms'

payout ratio ranges from 30 percent to 59 percent.³⁹ Either this means that the greater majority of the firms are suboptimizing and could increase their market value by either paying out more or less dividends, or else the models of M&M and Gordon are inapplicable to the real world.⁴⁰ Perhaps the assumptions imbedded in *ceteris paribus* are unrealistic. Theoretically, the Miller and Modigliani as well as the Gordon position are irrefutable granted the different assumptions of the two positions. The question then is why do the two conflicting models fail to depict the real world situation?

This paper does not attempt to resolve the conflict between M&M and Gordon. Instead, an effort is made to analyze an additional source of empirical evidence that may aid in ascertaining the role that dividends play in determining the market value of the firm.

³⁹Ibid., p. 4

⁴⁰Intermediate payout ratios would not appear to be inconsistent with the residual theory and the related simultaneous approach of Lerner and Carleton. The contention of the simultaneous approach is that the declining rate of return on investments realized by firms which move along their downward-sloping marginal efficiency of capital schedule may be responsible for different optimal payout ratios. Once a firm's marginal return on investment falls below its marginal cost of capital, the firm no longer finds it profitable to invest earnings and should pay dividends to shareholders.

See Eugene M. Lerner and Williard T. Carleton, A Theory of Financial Analysis (New York: Harcourt Brace Jovanovich, Inc., 1966).

CHAPTER III

METHOD OF RESEARCH

Several problems became apparent in the process of screening automatic dividend reinvestment plans as a possible area for empirical research. Very little work of an academic nature was available for background research as the development is one of recent history, since 1967. Also, the process itself seems to be picking up momentum and there is a possibility that the study might be outdated before it could be completed. When dealing with such a dynamic process, timing should be a critical issue and any survey must deal with a specific and relatively narrow time horizon or information from different sources may not be comparable due to changes that might take place. Subsequently, the decision was made to conduct a preliminary survey in the spring of 1972. Even then, it was obvious that the result of that survey would be mainly informational and that it would be necessary to follow up with a similar survey at a later date.

The Collection of Information

The fifty largest banks as defined by Fortune were contacted in the spring of 1972 on a very informal basis and a list of bank-managed plans in existence was collected from the 39 banks that responded to the initial survey. Plan descriptions were also generously supplied by several of these banks, along with bits and pieces of miscellaneous information. Several pragmatic articles, mostly in the business media

were helpful in providing background information. Mr. Bill Paul of the Wall Street Journal, Mr. Francis J. Walsh of the Conference Board, and the American Society of Corporate Secretaries were kind enough to provide needed information. Also a copy of a paper presented at the ABA Trust Operations and Automation Workshop in Atlanta, Georgia, by Joe L. Bookout¹ of North Carolina National Bank was extremely helpful. Since pertinent information needed to be collected simultaneously from several sources, it appeared that three populations should be surveyed to gather the type of information that the study required. Unfortunately, it soon became apparent that a survey of shareholders would be infeasible due to cost considerations and to the attitude which one financial executive so eloquently expressed with the following statement: "I would not give a list of our stockholders to my mother." Thus, two populations constituted the data sources for the study. The first of these, Fortune's Fifty Largest Banks had already been contacted. The second population was nonfinancial firms. Unable to deal with all nonfinancial firms, the decision was made to survey only the Standard and Poor 500. Financial data on these firms were obtained from the Compustat Tapes.

Several problems were also inherent in the population chosen to represent both the banks and the firms. Actually, not all bank-managed plans are handled by the fifty banks chosen, but the vast majority of them are. Consequently, some plans may be administered by banks not in the Fortune Fifty and could go unidentified. Yet errors in classifying firms as users or nonusers are much more likely to result from failure of the banks to respond to the survey than from defining the population of banks handling ADR plans as the Fortune Fifty.

¹Joe L. Bookout, Dividend Reinvestment, unpublished paper (North Carolina National Bank, March, 1973).

The necessity of defining the population of firms with ADR plans as the Standard and Poor 500 is a more serious problem. While the survey revealed that 376 financial and nonfinancial firms had established ADR plans, this study was limited to nonfinancial firms. A subsequent decision to restrict the population to members of the S&P 500 was made for several reasons. First of all, the computational burden of dealing with all financial and nonfinancial firms would be simply overwhelming. Also, the availability of data would surely be a problem and excluding the firms for which sufficient data were not available could well bias the results. It was felt that sufficient data would be available from the Compustat Tapes for most of the 500 and very little bias would result in that fewer firms would be excluded because of insufficient data. It is admitted that problems do exist in the use of the S&P 500 as a sample for all nonfinancial firms; however, the alternative of biasing the results by omitting a considerable number of firms for which data might not be available appeared less appealing. At least, it is hard to dispute that the sample chosen contains most of the productive power in our economy and occupies a pivotal position in the productive process.

A final survey of the fifty banks was conducted in September and October of 1973. At the same time a questionnaire was mailed to the S&P 500. Most of the responses were received within a one-month period. The respective response rates were 86 and 67 percent. It was fortunate not only that most of the banks responded but also that practically all of the twenty largest did. The corporate response rate was also considered high especially in light of the fact that some firms have a written policy against answering questionnaires.

The banks provided information on number, cost, and identity of the various plans that they administered. They also provided considerable literature that was being mailed to shareholders to solicit participation if they handled any such plans. Banks not administering ADR plans sometimes cited reasons for not offering their corporate depositors this service and often gave some indication of how they felt about the future possibility of administering these plans.

All correspondence between the banks was again on an informal and individual basis. To a large degree, requests were comparable among banks but to some degree differences existed. The differences in information required were to a large degree determined by several factors such as whether or not the bank responded to a similar request in the spring, whether or not the bank had identified itself as active in administering ADR plans, etc.

For the survey of S&P 500 firms, a different technique was employed. Some of the firms which had been prominent or innovative in the ADR movement such as American Telegraph and Telephone, Long Island Lighting Company,² General Motors, and Allegheny Power Company were contacted long before the questionnaire was mailed. Since the questionnaire itself needed to be short and easy to answer, two questionnaires were employed (see Exhibits I and II). The first questionnaire was designed to be answered only by firms with established ADR plans. The second questionnaire was, consequently, designed to be answered by those firms without an established ADR plan. Since a few of the firms had not been identified as users or nonusers, both questionnaires were

²Long Island Lighting Company does not belong to the S&P 500. Although data on Long Island Lighting Company were not used in the subsequent analysis, information that was obtained did prove useful.

EXHIBIT I

Questionnaire on
AUTOMATIC DIVIDEND REINVESTMENT PLANS
(Only for firms with established ADR plans)

1. When was your plan established? Month _____ Year _____

2. Is the administrative function of your plan handled by a commercial bank?

Yes _____ No _____

3. Approximately what percentage of your stockholders use the plan? Please make a "best guess" estimate.

	1973	Anticipated 1974
a. Percentage of number of stockholders	_____	_____
b. Percentage of shares outstanding	_____	_____

4. What is the approximate annual dollar volume of funds being reinvested in your stock via the ADR plan?

\$ _____

5. What were your primary reasons for establishing the plan? If more than one reason is applicable, please indicate the most important by 1, the second most important by 2, etc.

- a. To provide a service for those shareholders who want to save and not use current dividend income for consumption. _____
- b. To create a broader market for our common stock, thus holding up the price of our stock to some extent. _____
- c. To encourage small shareholders to own a larger portion of the company and increase ownership dispersion. _____
- d. To raise new capital for the company. _____
- e. Other, please specify. _____

6. Does your present plan allow you to issue new shares of common stock to participating shareholders?

Yes _____ No _____

If not, what are your present inclinations about such a feature?

- a. Still relatively uncertain. _____
- b. Have definitely rejected issuing new shares of common at least for some time. _____
- c. Expect to change our plan to include this feature sometime in the not so distant future. _____
- d. Have really never seriously considered the possibility _____

7. If a "significant" number of your stockholders elected to use the plan, might this influence your firm's dividend payout policy?

Yes _____ No _____

Name _____ Firm _____

EXHIBIT II

Questionnaire on
AUTOMATIC DIVIDEND REINVESTMENT PLANS
(Only for firms without established ADR plans)

1. Have you considered the idea of establishing such a plan?
 - a. The idea has simply never come up. _____
 - b. The idea has been considered in some detail and it was decided that a plan would not be feasible for our company at this time. _____
 - c. The idea is presently being explored
 1. and no decision has been made to date. _____
 2. and it appears quite likely that a plan may be established in the not too distant future. _____
 3. and it appears quite likely that the company will not establish a plan at this time. _____
2. If you have considered or are exploring an ADR plan at this time, does the plan involve new equity issues?

Yes _____ No _____
3. If you considered establishing a plan but rejected the idea, what were your reasons? If more than one reason is applicable, please indicate the most important by 1, the second most important by 2, etc.
 - a. The dollar volume of our dividend payments are so low as to make such a plan impractical. _____
 - b. The cost to the company would be too high. _____
 - c. The cost to participating stockholders would be too great. _____
 - d. We are convinced that our stockholders want current income, hence the actual number of stockholders that would want to participate would not be great enough to justify setting up an ADR plan. _____
 - e. Other, please specify. _____
4. At the present time, do you think that your company will set up a plan within the next three years if:

	<u>Yes</u>	<u>No</u>
a. The plan allows only for reinvestment in outstanding issues of common stock.	_____	_____
b. The plan allows only for the issuance of new shares of common stock to participating shareholders?	_____	_____

NAME _____ FIRM _____

sent to each firm along with a cover letter explaining the nature of the study and assuring respondents that information on the questionnaires would be kept confidential.

The questionnaire was addressed to the financial officer of the firm who appeared most likely to be directly involved in the operations should the firm have an ADR plan. Names and addresses were obtained from the Standard and Poor Corporation Directory.³ The first questionnaire was designed to ascertain the nature of the ADR plan of that particular firm, the rationale for establishing the plan, whether or not the success of the plan might have any effect upon dividend policy, and the degree of participation that the firm has experienced in that particular plan. Likewise, the second questionnaire attempted to determine whether or not ADR plans had been discussed. If so, several likely reasons for rejection were listed for the participant to designate. Finally, the questionnaire sought to determine the firmness of the rejection if there had been one. It was felt that this line of questioning would give information that might be useful in forecasting future growth as well as reflect the feelings of those managers who had rejected the ADR option.

The Analysis of the Data

Other than the tabulation of the frequency of various responses to the questionnaire and the calculation of simple averages, two other statistical techniques were employed. Multiple Discriminant Analysis and Multiple Regression Analysis were selected to develop profiles and

³Standard and Poor Register of Corporations, Directors and Executives (New York: Standard and Poor's Corporation, 1974).

to notice relationships of firms that were utilizing automatic dividend reinvestment plans.

The Multiple Discriminant Model

The statistical tool employed to test for hypothesized differences in the profiles of ADR users and nonusers was multiple discriminant analysis. MDA is cited by Sheth⁴ as being the appropriate statistical technique to employ when the independent variable consists of discernible classifications. It can be used as a predictive tool to classify observations into groups or as a means of developing profiles that distinguish characteristics between groups.

Multiple discriminant analysis

Discriminant analysis seeks to reduce a multivariate data group to a single variable with its linear transformation function selected in a manner which maximizes the ratio of variances between groups to inter-group variance. Several advantages are recognized. The problem is reduced in complexity from an I dimensional space to an $I - 1$ dimensional space. Also simultaneous consideration is given to all J variables rather than taking each into account on a univariate basis.

The underlying assumptions that a researcher makes in applying linear discriminant analysis are: (1) that all J variables are from a multivariate normal distribution in each of I exhaustive populations, (2) that the I populations are discrete and readily identifiable, (3) that each of the I populations can be characterized by J variables, and (4) that a linear relationship is the appropriate one to employ.

⁴Jagdish N. Sheth, "The Multivariate Revolution in Marketing Research," Journal of Marketing, XXXV (January, 1971), pp. 13-19.

Applications of MDA to problems in economics and business are numerous with Durand⁵ providing one of the earliest adaptations. Other contributors to financial analysis include Williams and Goodman,⁶ Altman,⁷ Pinches and Mingo,⁸ Simkowitz and Monroe,⁹ Klemkosky and Petty,¹⁰ Walter,¹¹ and Smith.¹²

The model

This particular statistical technique was employed to determine if ADR users display certain financial characteristics which differ from nonusers. The goal then is the development of profiles for firms that have implemented ADR plans. Since there are only two groups, users

⁵David Durand, Risk Elements in Consumer Installment Financing (New York, National Bureau of Economic Research, 1941).

⁶W.H. Williams and M.L. Goodman, "A Statistical Grouping of Corporations by Their Financial Characteristics," Journal of Financial and Quantitative Analysis, VI (September, 1971), pp. 1095-1104.

⁷Edward I. Altman, "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy," Journal of Finance, XXIII (September, 1968), pp. 589-609.

⁸George E. Pinches and Kent A. Mingo, "A Multivariate Analysis of Industrial Bond Ratings," Journal of Finance, XXVIII (March, 1973), pp. 1-18.

⁹Michael Simkowitz and Robert J. Monroe, "A Discriminant Analysis Function for Conglomerate Targets," Southern Journal of Business, VI (November, 1971), pp. 1-16.

¹⁰Robert C. Klemkosky and J. William Petty, "A Multivariate Analysis of Stock Price Variability," Journal of Business Research, I, No. 1 (Summer, 1973), pp. 1-10.

¹¹James E. Walter, "A Discriminant Function Earnings-Price Ratios of Large Industrial Corporations," Review of Economics and Statistics, XLI (February, 1959), pp. 42-52.

¹²Keith V. Smith, Classification of Investment Securities Using Multiple Discriminant Analysis, Institute Paper No. 101 (Purdue University Institute for Research in the Behavior, Economic and Management Sciences, 1965).

and nonusers, the problem is reduced from a two-dimensional to the one-dimensional form that follows:

$$Z = \sum_{j=1}^J B_j X_j .$$

Where Z is the transformation value of the discriminant function for an observation, the X_j 's are the independent variables, and the B_j 's are the weights or coefficients assigned to the independent variables. The linear transformation of the multivariate function, Z score, is thus a function of the independent variables for that observation and the weights. Classification of a firm as a user or nonuser is subsequently related to the B_j 's and the cutting score, Z^* , used to differentiate between users and nonusers. Observations in which the Z score is greater than Z^* are classified as belonging to one group. If the Z score is less than Z^* the observation is classified as belonging to the other group. Optimal weighting coefficients are determined in a manner which maximizes the differences between means for the two groups relative to the variation within groups for that particular variable. Both Z^* and the B_j 's were determined by a stepwise discriminant program (BioMedical Computer Program 07M).

Selection of variables

Seven categories of variables were selected for the study:

Return

X_1 - Three-year weighted average yield (change in market price plus dividend income divided by initial market price) for the years 1970-1972.¹³

¹³The respective weights used in the study for 1970-1972 were .2, .3 and .5.

Market Performance

X_2 - Average price earnings ratio for 1972 (high + low share price divided by EPS).

Growth

X_3 - Growth rate in EPS, the arithmetic mean, based on yearly data 1963-1972.

X_4 - Growth rate in EPS, the geometric mean, based on yearly data 1963-1972.

Solvency

X_5 - Current ratio for 1972.

X_6 - Debt over net worth for 1972.

Size

X_7 - Total dollar dividends paid in 1972.

X_8 - Total number of shareholders as of the end of 1972.

X_9 - Total assets as of the end of 1972.

Dividend Policy

X_{10} - Average dividend payout ratio for 10 years, 1963-1972, after throwing out the high and the low.

Industry Factor

X_{11} - Industry utilization factor based on S&P industry classification and equal to the number of firms in an industry using ADR's divided by the number of firms in that industry.

Variables were selected according to two criteria. First, variables which were considered to add to the predictive power of the model were included. Secondly, variables which might have otherwise proven to be good predictive variables were omitted from the study if their inclusion would have sufficiently reduced the sample size of the multiple discriminant model. In fact, this consideration was responsible for the omission of a risk category. Actually a sample using a risk variable, the beta coefficient calculated on quaterly data, was

run in a preliminary screening effort. With a sample of 30 firms, the beta coefficient was not found to be statistically significant. Even with these results, the beta coefficient would have been used in the model if its computation had not drastically reduced the number of firms having the required data.

Since the current ratio for utilities is subjected to a different interpretation, it was dropped for all but industrial firms. Return on book value was substituted for the current ratio in the analysis of public utilities since their profits are regulated. This additional return variable is more relevant for utilities. The resulting analysis, therefore, employed eleven independent variables for both utilities and industrials.

Since the coefficients of correlation between the size variables, total dollar dividends, number of shareholders outstanding, and total assets, were .83, .83 and .89, only the first of the three variables to enter the stepwise procedure in the MDA model was included in the analysis. The remaining two were omitted. Likewise, one growth variable was permitted in the final discriminant and regression equations. In the utility model only the most significant of the two return variables was allowed in the final equation:

The sample

The multiple discriminant analysis study of profiles of users versus nonusers had a sample of 205 industrial firms and 41 utilities. No railroads were used in either analysis. The great reduction in industrial firms from 425 to 205 was the result of two considerations.

If data items were missing or if EPS were negative in one of the years used to compute the geometric mean, that firm was omitted from

the study. It is admitted that the decision to compute the geometric mean excluded some 15 firms from the study. The preclusion of these firms contains in itself an element of bias in that the geometric mean could not be calculated without using imaginary numbers if the earnings per share were negative. Thus some of the weaker firms were probably excluded. In some cases the negative figure for EPS was apparently a freak occurrence and happened only once in the time span. In others it was not, and reflected the weakness of the firm. At any rate, the decision to use the variable was responsible for the preclusion of several firms. Since only a small number of firms were eliminated due to the inclusion of the geometric mean, the problem appears to be minor. The other alternative or the omission of the geometric mean as a variable would seem a more questionable approach.

Also a large number of firms were eliminated because they were on a different calendar year than the sample. It was felt that this step was necessary in a cross-sectorial study to insure that the firms were being compared for the same time period. The samples for the industrials and utilities were then broken down into users and non-users. Consequently, there were 72 users and 133 nonusers for industrial firms. The utility breakdown was 26 and 15 respectively.

The Multiple Regression Model

Multiple regression analysis was then employed to see if participation by shareholders in ADR plans followed from any financial characteristics of the firm. All the independent variables employed in multiple discriminant analysis were used except for the industrial utilization figure which was discarded. It was felt that the shareholders would not be guided by the concept of an industry norm as

management might. Two measures of a dependent variable were obtained from the questionnaire responses. Either the percent of total shareholders or the percentage of shares outstanding could serve as an indicator of the degree of participation in the ADR plans.

Several factors should be considered in determining the prominence and applicability of each participation measure. First of all what is the role that financial variables play in determining whether or not investors participate in ADR plans? That is, does a particular type of investor tend to affiliate himself with a firm with characteristics that suit his individual preferences? Such preferences could be in terms of a risk-return criterion or perhaps in terms of a preference for income or capital gains which might be inherent in the growth and dividend payout ratio of the firm. Since it was impossible to get information on individual shareholders and study their characteristics as independent variables influencing the participation ratio, it was assumed that the characteristics of the shareholder are inherent in the characteristics of the firm. The decision was thus made to use characteristics of the firm as a surrogate for shareholder characteristics. With this assumption also is an acceptance of a tendency for shareholders to invest in ventures that satisfy other preferences in addition to earnings. In other words, the assumed link between investor preferences is a result of accepting the "clientele theory" as well as the notion of "rationality." This linkage between investor preferences or characteristics and firm characteristics is clouded by the prominence of the institution investor in the market. It is presumed that the institutional investor's position in a stock may affect the degree of

participation profoundly. While it is possible to infer that the institutional investor may be particularly attracted to certain risk-return considerations, the resolution of the conflict between income and capital gains may be even more dominating. Endowments, for instance, have more or less traditionally limited expenditures to cash spinoffs from dividends and have shown a reluctance to liquidate stock holdings. Presumably, institutional investors being less affected by transfer charges and more sophisticated with regard to the concept of diversification may not rely on a dividend reinvestment mechanism to the extent that the small investor does. The same is true of the large investor but his preferences and characteristics, if logical, should be more discernible in the characteristics of the firm than the institutional investor. Since the institutional investor's behavior is different with respect to ADR plans than the individual, the position that an institutional investor has in a particular stock may then serve to obscure characteristics of shareholders if that position is quite large. Participation percentages are thus quite likely to be affected by the position of the institutional investor as well as the preference of shareholders for income or capital gains. For this reason the percent of shareholders participating may be a better measure than the percentage of shares outstanding. If the percent of shareholders is used as a dependent variable, the weight given to the institutional investor is minimized and its decision is not as prominent as it would be if the percentage of shares outstanding were used as the dependent variable.

Sufficient data for computation of variables were available for 34 industrial firms and 15 public utilities. The primary reason for

the sharp reduction from the sample of firms employed in the discriminant model was due to the fact that the dependent variable came from the questionnaire. Consequently, only those firms in the discriminant model sample which were classified as users and answered the questionnaire made up the regression model sample.

CHAPTER IV

CHARACTERISTIC PROFILES OF ADR USERS

One result of the rapid growth in the number of existing ADR plans is that financial executives in firms that do not offer an ADR option have been troubled by the decision of whether or not an ADR plan would be beneficial to the firm. Two questions that they most commonly asked have been, "What type of firm has historically offered ADR plans?" and "Have firms in some industries utilized ADR plans to a greater extent than firms in other industries?". The purpose of this chapter is to answer questions of this nature by developing profiles of users and nonusers.

The research techniques employed to differentiate characteristics of users and nonusers were multiple stepwise discriminant analysis and a test of the difference between two sample means. The multiple discriminant analysis (MDA) model employed eleven independent variables and one dependent variable. The dependent variable was one if the firm was a user and zero if the firm was a nonuser of ADR plans. The independent variables used were classified into the seven following categories:

Return

X_1 - Three-year weighted average yield (change in market price plus dividend income divided by initial market price) for the years 1970-1972.

Market Performance

X_2 - Average price earnings ratio for 1972 (high + low share price divided by EPS).

Growth

X_3 - Growth rate in EPS, the arithmetic mean, based on yearly data 1963-1972.

X_4 - Growth rate in EPS, the geometric mean, based on yearly data 1963-1972.

Solvency

X_5 - Current ratio for 1972.

X_6 - Debt over net worth for 1972.

Size

X_7 - Total dollar dividends paid in 1972.

X_8 - Total number of shareholders as of the end of 1972.

X_9 - Total assets as of the end of 1972.

Dividend Policy

X_{10} - Average dividend payout ratio for 10 years, 1963-1972, after throwing out the high and the low.

Industry Factor

X_{11} - Industry utilization factor based on S&P industry classification and equal to the number of firms in an industry using ADR's divided by the number of firms in that industry.

The Collection of Information

The data for the above variables were obtained from the two surveys and from the Compustat Tapes. Identification of the firms as ADR users or nonusers was a joint effort of the bank and firm surveys. The a priori classification of firms for the MDA model required the identification of all firms in the model as users or nonusers. In the test of the difference between two sample means the users became one sample and the nonusers the other. In both statistical procedures the industrials and the public utilities were handled separately. The empirical results of these statisti-

cal techniques for the industrials and the utilities will be considered in turn.

The Generation of Samples

Multiple discriminant analysis and a test of the statistical difference between two sample means were performed separately for the 205 industrial firms and the 41 public utilities.

In the MDA model the decision was made to split the industrial sample into two parts to eliminate the possibility of search bias. A function-generating sample of 103 firms and a holdout sample of 102 firms were then constructed by using a random number generator to separate the industrial firms into two groups. The function-generating sample contained 36 users and 67 nonusers. The holdout sample contained 36 users and 66 nonusers. Stepwise multiple discriminant analysis was then employed to fit a function to the generating sample. In turn, that function was used to classify the holdout sample.

The utilities were handled a little differently in that the total sample was too small to split; the function-generating sample and the classification sample were the same. Frank, Massey, and Morrison¹ noted that search bias may result unless the sample is split. Consequently, randomness may be responsible for the classifying power of some variables rather than any functional relationship. It was felt that splitting the sample would result in

¹Ronald E. Frank, William F. Massey, and Donald G. Morrison, "Bias in Multiple Discriminant Analysis," Journal of Marketing Research, II (August, 1965), pp. 252-253.

such a small function-generating and holdout sample, particularly for the nonuser, that the possible error due to search bias would be more than offset by the fact that sample sizes were so small. Additionally, it should be pointed out that the total sample of 41 utilities comprised a large portion of the 55 utilities that the sample sought to describe. The utility samples were identical to those in the test of the difference in two means.

Empirical Findings

Test of the Difference Between Two Means

A test of the statistical difference between the means of the two samples provided some information on the differences in profiles between the sample of users and nonusers. A Z score was determined for each of the eleven variables presented in Chapter III. The Z scores for the industrials are presented in Table II. A t test was performed on the utilities because of the small sample size. Both the t value and the Z value were determined by the following equation where the subscript denotes the sample (i.e., 1 is for the users and 2 is for the nonusers):

$$(4-1) \quad \frac{\bar{X}_1 - \bar{X}_2}{(S_1^2/N_1 + S_2^2/N_2)^{1/2}} = Z \text{ value or } t \text{ value.}$$

The t value or the Z value is then defined as the difference between the two sample means divided by the square root of the sum of the respective variances over the sample size of the group. In the case of the industrial firms where the sample sizes are 72 and 133, a Z score cutoff can be used to determine, within the confidence level,

if the difference is of statistical significance. Because of the smaller sample sizes used for the utilities, a t score cutoff is used with the figures in Table II for utilities. If the t value or Z value is greater than the t cutoff or the Z cutoff, the hypothesis that there is no statistical difference is rejected and the mean of the group of ADR users is greater than the mean of nonusers for that variable. If the t value or the Z value is less than a minus t cutoff or a minus Z cutoff, the hypothesis that there is no statistical difference is again rejected. However, this time the mean of the user group is statistically smaller than for the nonuser group for that particular variable. Using a two-tailed test for statistical significance at a 95 percent confidence level, the cutoff score for the normal distribution was determined to be 1.96. The only statistically significant variables at the .05 level are (from Table II) the average price earning ratio, growth in EPS (arithmetic mean), debt over net worth, the average dividend payout ratio, and the industry utilization factor.

Determination of the degrees of freedom needed to characterize the student distribution for a small sample size with unequal variances² is as follows:

$$(4-2) \quad v = \frac{(S_1^2/n_1 + S_2^2/n_2)^2}{\frac{(S_1^2/n_1)^2}{n_1 - 1} + \frac{(S_2^2/n_2)^2}{n_2 - 1}} - 2 .$$

None of the t values for the variables of the utilities were significant at the .05 level. The largest t value was 1.4756 for

²Roger L. Burford, Statistics: A Computer Approach (Columbus, Ohio: Charles E. Merrill Publishing Company, 1968), p. 245.

TABLE II
Z VALUES OF INDUSTRIAL FIRMS CALCULATED FOR SELECT VARIABLES

Variable	Z Value
1 - Weighted Average Yield	-0.4792
2 - Average Price Earnings Ratio	-3.3037
3 - Growth Rate in EPS (Arithmetic Mean)	-2.1708
4 - Growth Rate in EPS (Geometric Mean)	0.9558
5 - Current Ratio	-1.0686
6 - Debt Over Net Worth	-1.9827
7 - Total Dollar Dividends	1.4699
8 - Number of Shareholders	1.3870
9 - Total Assets	1.3265
10 - Average Dividend Payout Ratio	2.5893
11 - Industry Utilization Factor	8.2785

the dividend payout ratio. If a normal distribution had been assumed for the utilities, a t value of 1.4756 would not be significant. The cutoff values for a given level of significance are always higher for the t distribution than for the normal distribution unless the degrees of freedom are very large and then the t cutoff would approach the Z cutoff. Consequently, the t value for the average dividend payout ratio would not be significant even if a normal distribution could be assumed; likewise, it would not be statistically significant for a t distribution. The test is thus inconclusive at least for the utilities.

Multiple Discriminant Analysis

Stepwise multiple discriminant analysis was used to distinguish between users and nonusers for both industrial firms and utilities. Tables III and V summarize the steps by denoting which variables entered, the F value to enter, and the number of degrees of freedom remaining in the equation for industrials and utilities. The F values of the first two variables to enter the stepwise regression models for the industrials are both statistically significant at the .05 level. The critical F value for the .05 level with 1 degree of freedom in the numerator and 100 degrees of freedom in the denominator is 3.94.

The discriminant function developed by the stepwise procedure was then employed to classify companies as being either users or nonusers of ADR plans. The results are provided in Table IV. As Table IV reveals, the function correctly classified 24 of the 36 ADR users or 66.7 percent and 49 of the 66 nonusers or 74.2 percent. A chance classification³ could be expected to identify 35.3 percent of the users and 64.7 percent of the nonusers.

³A chance classification is a rather complicated issue when applied to a confusion matrix such as the one in Table IV. Obviously the best grouping in terms of percentages would be to classify all firms as nonusers. In the industrial sample the resulting classification would thus correctly identify all 66 nonusers but would misclassify all 36 users. The percentage correctly classified would thus be 64.7 percent. However, the resulting classification would not be consistent with the purpose of this chapter in that none of the users would be correctly identified. An alternate chance approach would be to classify half of the 102 firms as users and the other half as nonusers. On the average this approach would correctly classify 18 of the users and 33 of the nonusers or 50 percent. The problem with this approach lies in the fact that equal weights are given to two groups of unequal size. The particular chance classification used assumes that firms are classified in accordance with group size. Therefore, 66 firms would be classified as nonusers and 36 as users. On the average 42.7 firms would be correctly classified

TABLE III
SUMMARY STATISTICS OF STEPWISE MULTIPLE
DISCRIMINANT ANALYSIS FOR INDUSTRIALS

Step	Entering Variable	F-value to Enter	Degrees of Freedom
1	Industry Utilization Factor	36.7656	1/101
2	Average Price Earnings Ratio	9.6351	1/100
3	Total Dollar Dividends	2.3560	1/ 99

TABLE IV
CLASSIFICATION MATRIX FOR INDUSTRIAL
HOLDOUT SAMPLE

Actual	Classified	
	User	Nonuser
User	24	12
Nonuser	17	49

When the MDA model was applied to the sample of public utilities, none of the F values to enter were statistically significant at the .05 level for the utility variables in Table V. The critical value for the F distribution at that level with 1 degree of freedom in the

as nonusers and 12.7 firms correctly classified as users. The result is that an average of 55.4 of the 102 firms are correctly classified. The chance model should be expected to correctly classify 54.3 percent. The discriminant model above actually classified 73 of the 102 firms correctly or 71.6 percent. For additional information on the appropriate chance criterion to use see Donald G. Morrison, "On the Interpretation of Discriminant Analysis," Journal of Marketing Research, VI (May, 1969), pp. 157-158.

numerator and 39 degrees of freedom in the denominator is 4.11. Since the F value of the dividend payout ratio is not greater than 4.11, that variable is not statistically significant at the .05 level. Therefore, none of the other variables are statistically significant.

TABLE V
SUMMARY STATISTICS OF STEPWISE MULTIPLE
DISCRIMINANT ANALYSIS FOR UTILITIES

Step	Entering Variable	F value to Enter	Degrees of Freedom
1	Average Dividend Payout	2.1114	1/39
2	Average Price Earnings Ratio	1.9465	1/38
3	Total Number of Shareholders	1.2054	1/37

The utility discriminant function correctly classified 20 of the 26 users or 76.9 percent and 9 of the 15 nonusers or 60 percent. A chance classification⁴ could be expected to correctly identify 63.4 percent of the users and 37.6 percent of the nonusers.

TABLE VI
CLASSIFICATION MATRIX FOR UTILITY
HOLDOUT SAMPLE

Actual	Classified	
	User	Nonuser
User	20	6
Nonuser	6	9

⁴A chance classification could be expected to correctly identify 16.5 users and 5.5 nonusers. The percentage correctly classified by chance would then be 53.7 percent. The discriminant model actually correctly classified 29 of the 41 firms correctly or 70.7 percent.

Problems and Limitations

Application of the multiple discriminant model to the data collected was subjected to the following problems: (1) the technique employed to identify ADR users and nonusers may not have been completely accurate, (2) the proper classification techniques may not have been linear and (3) statistical problems such as specification bias, multicollinearity and spurious correlation may have been present.

In fact, positive identification of the users was not made with certainty. The procedure followed was to identify as many users as possible from the survey of the S&P 500 and the banks. Firms that were not subsequently identified as users were then concluded to be nonusers. Thus, there exists the possibility that some firms having established ADR plans may erroneously be classified as nonusers. While the possibility of this error does exist, the probability is not very large. Actually, slight errors of misclassification should not have a great effect upon the ability of the discriminant function to correctly identify users and nonusers.

The linear relationship assumption was of greater concern. Linear decision rules are appropriate in discriminant analysis when the group dispersion matrices (covariance matrices) are equal. While this study utilized linear classification rules, no determination was made as to whether or not the covariance matrices of users and nonusers were equal. The alternative of using a quadratic function was not viewed as being attractive even if the covariance matrices were unequal.

It has been substantiated that it may not be necessary to employ quadratic function. One argument that has been advanced is that the respective covariance matrices only have to approximate each other for

a linear relationship to suffice. Documentation to this effect from the Eisenbeis and Avery book on discriminant analysis is as follows:

There is some evidence that nonmultivariate normal data may be used in a discriminant analysis without significantly biasing the results. For the two group case, Gilbert has compared the performance of linear classification rules (estimating only dichotomous variables) with two rules based upon a logistic model and a rule formed on the assumption of mutual independence of the variables. The results imply that the loss using a linear rule "for classification as opposed to any other procedure is too small to be of much importance." Of course, as the number of variables increases, the Central Limit Theorem implies that the distribution of the discriminant scores for each group approaches a normal distribution. Hence, classification can be performed in the reduced discriminant space.⁵

Another argument is that if the discriminant function is able to identify the holdout sample well, a linear function is not inapplicable. It is conceivable that a quadratic function may perform better, but not necessarily so.

Specification bias and multicollinearity were the two statistical problem areas felt to be inherent in the use of MDA and in a test of the difference between two sample means for ADR users and nonusers. Specification bias is present when the dependent variable is a function of an omitted independent variable. It is also necessary that the omitted variable be correlated with an independent variable that is in the regression or discriminant equation. In particular, stepwise procedures are subjected to this problem because variables that are correlated with an independent variable in the equation are suppressed in the F test. A univariate t test is subjected to the same criticism.

Multicollinearity is a problem for which stepwise discriminant analysis adjusts to a great extent. Variables enter the stepwise pro-

⁵ Robert A. Eisenbeis and Robert B. Avery, Discriminant Analysis and Classification Procedures (Lexington, Massachusetts: D.C. Heath and Company, 1972), p. 37.

cedure in terms of the magnitude of the predictive power that each adds. Thus, a variable that is highly correlated with one that is already in solution will be suppressed in that its F ratio will not be very high. Variables with the highest F ratio enter the stepwise procedure first. Consequently, it was not surprising that the coefficients of correlations between variables in the final discriminant equations were small. The highest correlation coefficient between any of the variables in the final discriminant equation for the industrials was .07374. The value of the coefficient in the discriminant equation for utilities indicating the greatest correlation was $-.18432$. Since the t value calculated in the test for a statistical difference between two sample means is univariate, multicollinearity is not a problem.

A third potentially serious statistical problem follows from the manner in which the industry utilization factor was calculated. The numerator of the independent variable is the number of firms in an industry with established ADR plans. Its denominator is the number of firms in an industry. The dependent variable in the MDA model is one if a firm is a user and zero if the firm is a nonuser. Since the a priori identification of whether a firm is a user or nonuser was an input into the calculation of the utilization factor and determined the independent variable as well, spurious correlation must exist.

The question then arises as to whether or not the predictive power of the utilization factor is a result of the spurious correlation. If not, is there some kind of industry effect that has a bearing on whether or not a firm may be inclined to establish an ADR plan?

In defense of using the variable, it should be pointed out that the a priori classification of each firm is only a component of the

utilization factor. The actual proportion of the variable that a particular firm accounts for is equal to the reciprocal of the number of firms in an industry. Consequently, as the size of the industry increases, the degree of spurious correlation should decrease. The average number of firms per industry in the discriminant model for the industrials was 5.4. The modal class contained 6 firms. Of the 63 industry classifications used in the model, 52 had 4 or more firms. The smallest number of firms in any classification was 2; the largest was 20.

Also, the utilization factor will be the same for users and non-users within an industry. Therefore, the utilization factor does not reveal whether a firm is a user or nonuser. What it does reveal is the percentage of firms in an industry which have established ADR plans. For example, in an industry of 5 firms with 2 users, the utilization factor is .40 or 40 percent for all firms in that industry.

The principal argument against the use of the utilization factor contends that to use the variable is akin to employing knowledge of whether a firm is a user or nonuser as an independent variable. Thus, a priori classification of firms is necessary in order to discriminate between users and nonusers.

This study acknowledges that spurious correlation does exist and may be responsible for some of the predictive power of the model. However, the industry effect may still be of merit. As previously stated, discriminant analysis has a dual application. It can be used as a predictive tool or it can be used to determine characteristics that distinguish dichotomous groups such as users and nonusers.

In the purely predictive sense, spurious correlation does not

constitute a shortcoming. In fact, the a priori classification of users and nonusers is a prerequisite for employing discriminant analysis. Any problem that arises is attributable to the use of MDA to develop characteristic profiles of users and nonusers.

Since spurious correlation may have invalidated any conclusions that the discriminant model reached on the utilization factor, a chi-square (X^2) test was also employed to ascertain whether there was any evidence of an industry effect. The hypothesis tested was that the number of firms in an industry utilizing ADR plans is independent of the industry classification. The categories for the test of independence were the number of firms in an industry employing ADR plans. Since 109 out of the 425 industrial firms have established ADR plans, the probability of an industrial firm having ADR plans is 25.65 percent. Expected values were then calculated using a binomial distribution with the probability equal to .25. The number of firms in an industrial classification became the sample size.

The binomial distribution was used to determine the expected number of firms for different industrial classifications that would have employed ADR plans if the utilization of these plans were independent of any industrial effect. The expected number of firms for each category was determined by summing the above values. Chi-square was calculated using the following equation:

$$(4-3) \quad X^2 = \sum_{i=1}^N \frac{(O_i - E_i)^2}{E_i}$$

where i denotes the category, N is the number of categories, O represents observed number of firms in an industrial classification and E is the expected number of firms. The calculated value of X^2 was determined

to be 9.98. The X^2 value from the table with 3 degrees of freedom at the .05 level was 7.815. The hypothesis is thus rejected. Evidently, there appears to be evidence that some industry effect may exist.

The discriminant model was also run for industrials without the utilization factor. The only variable with an F to enter significant at the .05 level was the average price earnings ratio. Other variables in the discriminant equation were (in order of appearance) total dollar dividends, debt to net worth, average dividend payout ratio and growth in EPS (geometric mean). The equation, thus generated, correctly classified 64 percent of the users and 46 percent of the nonusers in the holdout sample. It was previously determined that a chance classification could be expected to identify 35.3 percent of the users and 64.7 percent of the nonusers. Consequently, the model could not be said to differ much from a chance model in terms of predictive power. The loss of the utilization factor evidently had a pronounced effect upon the predictive power of the MDA model.

Conclusions

Both the test of the difference between two sample means and the stepwise discriminant model failed to provide any conclusive results for the utility sample. Part of the problem appeared to be that the financial characteristics within the utility industry are quite similar. This should not be unexpected for a regulated industry producing products which are practically identical. Even though none of the three variables in solution have statistically significant F values, it is particularly interesting to note that the first variable to enter the stepwise procedure was the dividend payout ratio. A size variable

(total number of shareholders outstanding) was the final variable to enter. Although there were slight differences in the variables included in the two empirical models, the results for the industrial firms and the public utilities were comparable.

Five independent variables were significant in the tests for statistical differences between ADR users and nonusers in the sample for industrial firms. The significant variables were: the average price earnings ratio, growth in EPS (arithmetic mean), debt over net worth, the average dividend payout ratio and the industry utilization factor. Only two variables had statistically significant F values to enter in the MDA model. They were the industry utilization factor and the average price earnings ratio.

It was interesting to note that the industry utilization factor had, by far, the largest F to enter and Z value. It was apparent that the industry norm was responsible for much of the predictive power of the MDA model. However, caution should be urged in determining the role that the industry effect plays. While the X^2 test would appear to indicate that there is some industry effect, it may not be as pronounced as the discriminant model for industrial firms may lead one to believe.

The second variable to enter the equation, the average price earnings ratio, had the second largest F to enter and Z value. While it is true that the variable with the largest Z value should be the first to enter a stepwise discriminant model and should have the largest F to enter, a similar analogy does not necessarily hold for the variable with the second largest Z value. This is likely to be true if there is strong correlation between the variables that have

the two largest Z values. Once the first variable is in solution in the stepwise model, the discriminatory power of the second variable is reduced and its F value to enter may drop below the F value to enter of variables with smaller Z values which are not as strongly correlated with the first variable.

There exists a strong a priori reason to believe that correlation exists in varying degrees between the industry utilization factor and many of the other independent variables in the model. The reason this correlation is likely to exist is that an industrial classification attempts to group firms with similar products. Since financial characteristics often prove similar within industrial groupings, less variability in these characteristics takes place within an industrial grouping than between the different industrial classifications. Consequently, it appears that the MDA model may suffer from specification bias if the utilization factor is credited with explaining differences in the two groups that are actually a function of other financial variables with which the utilization factor is correlated. On the other hand, the utilization factor seems to afford more explanatory power than the other independent variables. Thus, the variable may offer some tangible source of explanation of true differences between users and nonusers.

Perhaps that difference is little more than an industrial leadership effect where the largest firms in some industries implement ADR plans and the smaller firms follow in turn. This effect of trying to "keep up with the Joneses" may exist in the industry sector as well as in consumer behavior. Some evidence to support such an effect is evident. The Z value for all the size variables are positive. This means that the average of total assets, number of shareholders, and

dollar dividends are higher for firms with ADR plans than for those without. In the classical test of hypothesis sense, statistical significance cannot be proven in that none of the Z values are greater than 1.96. However, it should be remembered that this does not disprove the possibility either. Also, the fact that all three are positive and that the smallest Z value of the three is 1.3265 should reinforce the premise that large firms are more likely to establish ADR plans than small firms.

However, the result of the test of the difference between two sample means was felt to be superior in developing profiles because of the a priori belief that the utilization factor and the use of stepwise discriminant analysis resulted in the omission of variables that characterize ADR users and nonusers. It was apparent from this statistical test that industrial firms which are ADR users have lower average price earnings ratios, lower growth rates, lower ratios of debt to net worth and higher average dividend payout ratios. Perhaps firms that establish ADR plans tend to be low risk and low growth firms.

CHAPTER V

SURVEY FINDINGS

As a result of the ADR movement, financial executives are showing concern for answers to questions such as: (1) How do ADR plans work? (2) Who administers them? (3) What are the costs to participants? (4) Are there any legal complications? (5) Do the firms and shareholders realize any benefits? (6) What kind of participation rate should a firm expect? (7) Why have some firms established ADR plan options while others have not? (8) Is there any inherent information in the ADR experience which should affect dividend policy?

The purpose of this chapter is to answer these and other questions that are a result of the rapid growth in the ADR movement. In collecting information to answer questions of this nature, banks and firms were surveyed on the subject. Information from the surveys will be presented and analyzed after the mechanics of automatic dividend reinvestment plans have been discussed.

The Nature of Automatic Dividend Reinvestment Plans¹

Operating Characteristics of ADR Plans

Although the automatic reinvestment of dividends has for some time been an option to shareholders of mutual funds, savings and loan associations, mutual savings banks, and some insurance companies, nonfinancial corporations have only recently begun to provide this

¹Much of the discussion on the nature of ADR plans parallels Richard H. Pettway and R. Phil Malone, "Automatic Dividend Reinvestment Plans of Nonfinancial Corporations," Financial Management (in press).

option to stockholders. While the concept is quite comparable, the actual plans available for shareholders in nonfinancial corporations are still distinctly different from those of financial institutions. For instance, open-end mutual funds provide for the issuance of new shares to participants while the majority of corporate ADR plans deal in outstanding issues and charge shareholders a fee to participate. Some mutual funds do charge a load fee which is likely to be higher than the administrative and brokerage charges to participate in ADR plans.

The similarities between corporation ADR plans and the dividend reinvestment programs of mutual funds are multifold. Each utilizes the concept of pooling ownership of certificates in an account without necessitating the issuance of the security in the shareholder's name. Ownership information is provided by the issuance of periodic statements showing the number of shares held in trust, the receipt of cash dividends, and the subsequent purchase of shares. Information of this nature is necessary since dividends are taxable even though shareholders may not actually receive a cash dividend.

The automatic dividend reinvestment plans offered by nonfinancial firms are basically of two types: the bank-trust department administered plans and the firm-administered plans. As of November 1, 1973, 265 nonfinancial corporations had provided their shareholders with an ADR option. Over 98 percent² of these plans are bank administered. Under bank-administered plans the corporations pay the cash dividends of stockholders, who elect to participate, directly to the trust department of the bank. The trust department maintains ac-

²Only three of the nonfinancial plans are firm managed.

counts for each participating shareholder. The managing trust department purchases the firm's common shares in the open market and distributes these shares to the shareholders' accounts on a prorata basis of the actual amount of the dividends received in each account less prorated brokerage costs and less some administrative costs as a percentage of the dollar dividend reinvested. The marginal rate of the predetermined administrative fee commonly decreases with the size of dividends reinvested. This fee is frequently subjected to some maximum. The brokerage fees are quite likely to be significantly less than they would have been for a comparable purchase on the market by the individual shareholder. The total charge is likely to be less for the small investor who may purchase in odd lots and is consequently subjected to the odd-lot differential.

The bank, on the other hand, aggregates the purchases of all the participating shareholders and in some instances may purchase large blocks off the exchange. Many banks, which are currently administering ADR plans for firms, have purchased or developed computer programs to handle the administrative details which carry share division among individual investors to three decimal places.

In most cases a stockholder who elects to participate in an ADR plan may make contributions in addition to the total dollar dividends. Frequently, limits (such as \$500 or \$1,000 in additional investments per dividend period) are placed on non-dividend reinvestments. Most plans also allow stockholders to liquidate their investment at any time. Typically the shareholder can withdraw and elect to take shares of stock or often have the bank convert the shares into cash at little or no charge. Thus, stockholders are actually given a remarkable

degree of flexibility and make only a short-run commitment to reinvest their dividends.

Recently a unique type of bank-managed plan has evolved. Unlike the traditional plan it allows shareholders to purchase newly issued rather than outstanding shares of the company's common stock. The first company to offer such a plan was Long Island Lighting Company in November 1972. Currently three additional firms have a similar plan. Allowing for reinvestment into a new issue is a recent and interesting departure from the normal type of ADR plans and more will be said about this departure in later chapters.

Although specific details of the purchase of outstanding stock by the administrator (bank or firm) vary from plan to plan, generally the critical price used in the process of reinvesting dividends into existing shares is the average of all costs actually incurred during the purchase period. The administrator is allowed to purchase in any market; all purchases normally are made within 30 days of the dividend payment date. When the plan purchases new shares, the administrator either uses the closing price or an average of high and low prices of the shares traded on the NYSE on the dividend payment date as the exchange price of new stock for the shareholders' dividends.

There are only three firm-managed programs. In July 1972, General Motors was the first company to establish such a program. Currently the General Motors' plan deals only in outstanding issues of stock. Two other large firms, American Telephone and Telegraph and International Paper Company, have plans that deal with new issues of common stock.

The experiences of American Telephone and Telegraph are inter-

esting and worth summarizing. American Telephone and Telegraph Company was one of the first firms to establish an ADR plan (in 1969 with the First National City Bank). In June of 1973 the firm allowed its shareholders to participate in a firm-administered plan which superseded the old ADR bank-administered plan. The new ADR plan allowed the reinvestment of participating shareholders' dividends to be used to purchase only new common stock of the firm. Under the old plan the firm experienced a participation of about 7 1/2 percent of the number of shares outstanding with a volume of about \$70 million of market purchases in 1972. Under the new plan AT&T expects about 12 percent participation and about \$160 million of new equity sales annually.³

Classifying a plan as firm-administered does not mean that a bank is not acting as transfer agent but rather that the firm itself has retained the responsibility of the record keeping and administration of the ADR plan. Firms which manage their own plan do employ banks to act as transfer agents.

Perhaps one of the most interesting differences between the four types of plans is the cost factor. Table VII was prepared to facilitate cost comparisons between the various plans. Not all 265 firms are included as cost information was not obtainable either because of reluctance on the part of some banks to provide this information on a firm-by-firm basis or due to the failure of firms to reply to inquiry. However, sufficiently detailed information was obtained on the cost of 235 different plans.

³Pettway and Malone (in press).

TABLE VII
COST TO PARTICIPANTS
FOR VARIOUS TYPES OF ADR PLANS*

Type of Plan	Administrative Fee	Brokerage Charges	Number of Firms
Bank Administered dealing only in outstanding issues	2% up to \$2.00 maximum	prorated	3
	2 1/2% up to \$2.50 maximum	prorated	1
	4% up to \$2.50 maximum	prorated	25
	5% up to \$2.50 maximum	prorated	188
	5% up to \$3.00 maximum \$1.00 minimum	prorated	11
Bank Administered dealing in new issues	no charge	no charge	4
Firm Administered dealing in out- standing issues	2% up to \$2.00 maximum	prorated	1
Firm Administered dealing in new issues	no charge	no charge	2

*Richard H. Pettway and R. Phil Malone, "Automatic Dividend Reinvestment Plans of Nonfinancial Corporations," Financial Management (in press).

Most of the firms on which information was available charge an administrative fee of 5 percent and prorated brokerage cost. However, none of the 4 plans dealing in new issues assessed charges against participating shareholders and the one firm-managed plan charged participating shareholders considerably less than the norm for bank-managed plans.

Legal Considerations

While there are currently no legal requirements specifically

relating to ADR plans, certain existing rules and regulations are being applied by the Securities and Exchange Commission (S.E.C.). The Investment Company Act of 1940 and the Securities Act of 1933, in particular, have been applied if an ADR plan is managed by an "affiliate" or if the plan provides for the issuance of new shares of common stock. If there is no "affiliate" relationship between the firm and the administrative agent and if the plan deals only in outstanding shares purchased on the market, requirements under these two acts are generally inapplicable. The majority of ADR plans, being bank administered and dealing only in outstanding issues, have been exempt from these requirements.

If the S.E.C. determines that an "affiliate" relationship exists such as with firm-administered plans, then the rules in Release Number 4790 are applied. Release Number 4790 was designed to apply to employee stock purchase plans and determines whether registration under the Securities Act of 1933 is necessary. Departures from the standards set by that release may require registration. In the event that a plan deals in new issues of common stock, such as the AT&T plan, then all pertinent requirements of the Securities Act of 1933 are applicable.

The development of ADR plans has been closely followed by the Securities and Exchange Commission and current interpretations may change at any time. Further rules and regulations may even be forthcoming.

Advantages and Disadvantages

Financial executives indicated that firms allowing stockholders to participate in ADR plans often realize several advantages. Plans which purchase only existing shares of common may generate some share-

holder goodwill among participants. Secondly, small shareholders are further encouraged to own a larger portion of the company's outstanding stock in that the cost of purchasing additional shares is quite often less for them than it would have been otherwise. Also, many corporations have found that they save considerably in terms of the operating expense normally incurred with the cash dividend payment. Operating expense reductions result from elimination of the expenses for that fraction of stockholders who are participating in the reinvestment plan. Executives claim that these cost savings offset the charges which are paid by the company to the administering bank in the form of incidental expenses for mailing solicitations to participate, account statements, etc. A final possible advantage to the firm is that the plans may generate greater shareholder demand for the stock than would have been present otherwise. Thus, additional buying pressure may be created for the stock.

If the plan deals in new rather than outstanding issues then perhaps some additional advantages may be recognized. First, the addition to equity accounts through the sale of new shares could reduce the debt ratio and improve the firm's access to capital markets. Second, it could provide a regular source of new equity as long as shareholders elected to reinvest dividends. Finally, the firm would be able to sell new equity at higher net prices than with conventional flotation due to the almost negligible issue cost if a reinvestment plan is used.

Possible advantages to participating shareholders were also suggested: (1) purchasing costs for small investors are considerably less than they would be if the investor had to pay the brokerage

charge that he would incur on an individual purchase, (2) investors need not wait and accumulate enough cash to purchase a round lot in order to avoid the odd-lot differential, (3) the purchase of fractional shares is even possible and (4) finally, ADR plans encourage forced saving, as the shareholder never receives his dividend check and may not be as likely to consume the proceeds.

From the standpoint of the firm it would also seem that several possible disadvantages exist. Efforts to terminate an existing plan that has not been successful might be looked upon unfavorably by those shareholders who are participants. Also, institutional investors as well as shareholders who are not interested in this option may view any additional expenses by the firm that benefit a segment of ownership more than another as unethical.

Even the participating shareholder may be placing himself in a disadvantageous position. The decision to participate in an ADR, while only a short-run commitment, still reduces the investor's liquidity in that he has elected to forego the receipt of cash. The investor's flexibility is thus somewhat decreased, at least for the short-run. Also, shareholders who simply reinvest shares may not tend to diversify themselves as well since the decision to automatically reinvest dividends limits the resources that can be invested elsewhere.

Questionnaire Results

Two populations were surveyed for information in gathering data on the ADR movement. Much of the information from the banks was incorporated into the background material on the ADR movement earlier in this chapter. The second population surveyed was the firms which

comprise the S&P 500. In fact, the questionnaire survey of the firms was the central information collecting effort of this study. Actually, two questionnaires were employed. The first (see Exhibit I, Chapter III) sought to provide information on the rationale and the degree of success, as measured by the reinvestment volume and the participation percentage, realized by firms with established ADR plans. The second questionnaire (see Exhibit II, Chapter III) was intended for firms that had not yet implemented an ADR plan. It sought to provide information as to the degree of consideration that had been given to the possibility of establishing ADR plans. Inherent in such information should be some indication of the potential for growth in the ADR movement as well as the rationale for not establishing ADR plans.

Questionnaire I

The first questionnaire was designed to be answered by firms with established ADR plans. Of the 284 firms responding to the survey out of a possible 500, 94⁴ had established or expected to establish an ADR plan within two months. Thus, of the firms returning the survey, 33.1 percent had established or soon would establish an ADR plan. The remaining 190 firms did not have an established ADR plan.

Question one was designed to provide some historical evidence on the momentum of the ADR movement. The answers to this question are summarized in Table VIII. A frequency tally by years reveals that the year 1972 and the first ten months of 1973 were particularly prominent in the ADR movement for the 90 firms that answered the first question.

⁴One firm expected to have its plan functional by December, 1973. The other 93 plans were functional.

TABLE VIII
YEARS IN WHICH FIRMS RESPONDING
TO THE QUESTIONNAIRE ESTABLISHED ADR PLANS*

Year	Number of Firms	Percent of Total
1968	1	1.1
1969	2	2.2
1970	1	1.1
1971	7	7.8
1972	36	40.0
1973**	<u>43</u>	<u>47.8</u>
	90	100.0

* Information from questionnaire survey of S&P 500.

** Includes only the ten-month period of January through October.

The second question sought to ascertain the prevalence of bank-managed ADR plans as opposed to those in which the administrative procedure is assumed by the firms themselves. Only three of the firms indicated that they administered their own plans. Two firms failed to respond and the remaining eighty-nine employed a commercial bank as administrative agent.

The next question tried to ascertain how successful the firm's ADR plan was. Tables IX and X represent an attempt to summarize the information given by the firms in answering question three. Despite the fact that different class intervals were used, .99 for Table IX and .49 for Table X, the data show that participation by number of shareholders is greater than by the number of shares outstanding.

TABLE IX
ESTIMATED PARTICIPATION BY
PERCENTAGE OF SHAREHOLDERS FOR 1973 AND 1974

Class Limits	1973		1974	
	Number of Firms	Percent of Total	Number of Firms	Percent of Total
.00 - .99	0	0.0	0	0.0
1.00 - 1.99	2	2.3	0	0.0
2.00 - 2.99	3	3.5	1	1.3
3.00 - 3.99	13	14.9	9	11.4
4.00 - 4.99	14	16.1	4	5.1
5.00 - 5.99	12	13.8	9	11.4
6.00 - 6.99	8	9.2	14	17.7
7.00 - 7.99	13	14.9	10	12.6
8.00 - 8.99	11	12.6	11	13.9
9.00 - 9.99	2	2.3	5	6.3
10.00 - 10.99	6	6.9	9	11.4
11.00 or above*	<u>3</u>	<u>3.5</u>	<u>7</u>	<u>8.9</u>
	87	100.0	79	100.0

*In 1973 only three firms had greater than 11 percent of their shareholders participating in an ADR plan. One firm had 11.8 percent and the other two 12 percent. The 1974 estimates result in 7 firms in that category. The respective estimates are for 11 percent, 11 percent, 11.8 percent, 12 percent, 12 percent, 13.5 percent and 15.0 percent.

TABLE X

THE ESTIMATED PERCENTAGE OF SHARES
OUTSTANDING PARTICIPATING IN ADR PLANS FOR 1973 AND 1974

Class Limits	1973		1974	
	Number of Firms	Percent of Total	Number of Firms	Percent of Total
.00 - .49	10	12.4	4	5.6
.50 - .99	23	28.4	14	19.7
1.00 - 1.49	18	22.2	15	21.1
1.50 - 1.99	10	12.4	10	14.1
2.00 - 2.49	4	4.9	8	11.3
2.50 - 2.99	4	4.9	5	7.1
3.00 - 3.49	6	7.4	5	7.1
3.50 - 3.99	0	0.0	2	2.8
4.00 - 4.49	1	1.2	2	2.8
4.50 - 4.99	0	0.0	1	1.4
5.00 - 5.49	3	3.7	2	2.8
5.50 or over*	<u>2</u>	<u>2.5</u>	<u>3</u>	<u>4.2</u>
	81	100.0	71	100.0

*In 1973 only two firms had estimated that greater than 5 1/2 percent of the outstanding shares were participating in the plan. One firm estimated that the participation rate was 6 percent and the other 6 1/2 percent. Three firms had estimates in this category for 1974. The estimates were 6 1/2 percent, 7 percent, and 8 percent.

Also, in spite of the fact that the number of responses decreases respectively from 87 to 79 and from 81 to 71 in the two tables, the expectations are that participation will be higher in 1974 than it was in 1973, regardless of the measure of participation used.

The fourth question sought to determine the volume of funds reinvested annually by shareholders through the ADR mechanism. Table XI is a frequency tally of the responses to that question. The range of the annual dollar volume is from \$20,000 to \$160,000,000. Because of excessive positive skewness the mean was considered to be a relatively poor measure of central tendency and was not calculated. The modal class is the first class with limits of \$0 and less than \$250,000. The median is \$383,000. Of the 81 firms answering question four, 29 had an annual dollar reinvestment below \$250,000. While only 9 of the responding firms had an annual dollar volume under \$100,000, 22 firms estimated their annual reinvestment as being over \$1,000,000. Approximately 68 percent of the firms had an annual dollar volume less than \$750,000. An annual dollar volume of less than \$1,250,000 was the estimate of 80.1 percent of the responding firms.

Question five made an effort to reveal the most prominent reasons for the implementation of ADR plans by firms. The responses to this question are summarized in Table XII. If the respondent failed to designate the importance of his answers, as indicated in the questionnaire, all of his selections were treated as first choices. Two reasons appear to account for the establishment of most ADR plans. By far the most important reason appears to be that the plans provide a service for those shareholders who want to save

TABLE XI
THE ESTIMATED ANNUAL DOLLAR VOLUME
OF FUNDS INVESTED THROUGH ESTABLISHED ADR PLANS

Class Limits	Number of Firms	Percent of Total
Less than 250*	29	35.8
250 - 749	26	32.0
750 - 1,249	10	12.3
1,250 - 1,749	6	7.4
1,750 - 2,249	0	0.0
2,250 - 2,749	2	2.5
2,750 - 3,249	2	2.5
3,250 - 3,749	0	0.0
3,750 - 4,249	0	0.0
4,250 - 4,749	2	2.5
4,750 - 5,249	2	2.5
5,250 or more**	<u>2</u>	<u>2.5</u>
	81	100.0

*The smallest estimated annual dollar volume was \$20,000. Nine of the responding firms or 11.25 percent had an estimated annual dollar volume less than \$100,000.

**The two largest plans in terms of estimated annual dollar volume were General Motors and American Telephone and Telegraph with respective estimates of \$20,000,000 and \$160,000,000. Twenty-two firms had estimates above \$1,000,000. Twenty-seven and one-half percent of the 81 firms answering that question had estimated annual investments of over a million dollars.

TABLE XII

REASONS GIVEN FOR
ESTABLISHING AN ADR PLAN

Response	First** Choice	Second Choice	Third Choice	Fourth Choice
a As a service allowing shareholders to save.	69	12	3	0
b Create a broader market for common stock.	7	11	8	1
c Encourage small shareholder to increase ownership.	26	21	4	0
d To raise new capital for the company.	1	0	0	2
e* Other	2	6	2	0

*Most of the other reasons provided by respondents to the questionnaire expressed a desire on the part of the companies to improve stockholder relations by providing an inexpensive and convenient method for the small investor to purchase additional stock.

**In the event that the respondent failed to order selections, all such reasons were treated as if they were, in fact, the most important or primary reason.

and do not want to use current dividends for consumption. The second most important reason given was that ADR plans encourage small shareholders to own a larger portion of the company and increase ownership dispersion. Other reasons cited by respondents are that the plans provide an inexpensive way for small investors to purchase additional stock and, from the viewpoint of the firm, ADR plans may improve stockholder relations.

Responses to the sixth question revealed that only 5 of the existing ADR plans allowed for the purchase of new shares of common stock. Two firms failed to answer the question and the remaining 87 had an ADR plan which dealt only in already outstanding issues of common stock. The 87 firms which did not utilize new common issues were then asked whether or not they expected to issue new shares through ADR plans in the future. Of the 82 responding firms only 3 expected to utilize new common issue in the near future while 26 firms had rejected the possibility for some time. The remaining 53 firms were either uncertain or had never really seriously considered the possibility.

Finally, Questionnaire I sought to determine if financial executives would draw upon their ADR experience and change the dividend payout ratio if a "significant" number of shareholders participated in their automatic dividend reinvestment plan. The seventh question was responded to by 86 executives. Only 6 felt that the firm's dividend payout ratio policy might change if a "significant" number of the firm's shareholders participated in their ADR plan.

Problems arose in the interpretation of answers to this question. First respondents seemed to have difficulty with the word "significant."

TABLE XIII

RESPONSES AS TO PRESENT INCLINATIONS OF THE
POSSIBILITY OF USING NEW STOCK RATHER THAN
OUTSTANDING COMMON IN ADR PLANS

Response	Number of Firms	Percent of Total
a* Still relatively uncertain.	17	20.2
b Definitely rejected the idea.	26	30.9
c* Expect to include this feature in near future.	5	6.0
d* Never seriously considered the possibility.	<u>36</u>	<u>42.9</u>
Total	84	100.0

*Two respondents listed two alternatives as describing their inclinations toward utilizing an ADR plan to issue new shares of common stock. One listed a and d; the other respondent listed c and d. In the tabulation of the relevant frequency each such answer contributed two elements to the above frequency tally.

Secondly, the historical participation by some firms has been so low that many executives could not conceptually accept the possibility that participation might be this high. In many cases the firm is unlikely to see a very high participation rate. In that respect the question asked them to assume something contrary to experience. Unfortunately, no apparent way around these two problems was evident in the study. There is no way to substitute a participation percentage for the word "significant" because different percentages might well draw different responses from the various executives. Also no apparent remedy was known which would enable some of the executives to relate to the possibility that their participation percentage might be quite high in the future.

Questionnaire II

The second questionnaire was intended for those firms that had not yet implemented an automatic dividend reinvestment plan for their shareholders. Of the firms responding to the survey 190 firms identified themselves as being in this position. That is, 66.9 percent of the responding firms did not have an established ADR plan.

The first question sought to gauge these firms as to their present position with respect to establishing an ADR plan. The results are summarized in Table XIV. Only 19 firms had never considered the possibility while 95 firms had rejected the possibility for the present time. The remaining 76 firms which were currently exploring the possibility were further subdivided according to assessments of their present position. Consequently, 37 firms had not yet made a decision while 31 firms felt that it was quite likely that they may establish an ADR plan in the near future. Only 8 firms felt that it was

TABLE XIV

CURRENT POSITIONS OF FIRMS WITH RESPECT TO
IMPLEMENTING ADR PLANS

Response		Number of Firms	Percent of Total
a	The idea has never come up.	19	10.0
b	The idea has been considered and rejected.	95	50.0
c - total	The idea is presently being explored:	76	40.0
- 1	and no decision has been made to date.	37	19.5
- 2	and it appears likely that a plan may be established.	31	16.3
- 3	and it appears unlikely that a plan will be established.	8	4.2
	Total	190	100.0

likely that they would not establish such a plan.

Question number two tried to determine the number of firms that were exploring plans that involved new equity issues. For this reason, only those firms that were currently exploring the possibility of implementing an ADR plan were of interest. The 8 firms that did not expect to establish an ADR plan in the near future were also excluded because their response was almost equivalent to a rejection. Only 7 firms were considering plans that involved new equity issues. Plans involving outstanding common stock were considered by 55 firms. Some firms indicated that they were considering both types of plans.

The intent of the next question was to ascertain the most prominent reasons that firms have for rejecting ADR plans. Consequently, only firms that had rejected the option or felt it likely that they would reject were tallied in collecting information from this question. A summary of that tabulation is available in Table XV. Because respondents were asked to order their responses, frequencies in the table are ranked according to the preferences of the respondents. In the event that respondents failed to rank choices, all selections were treated in the tabulations as if each was a first choice.

The response data in Table XV reveal that the predominant reasons for not establishing an ADR plan were that the dollar volume of dividend payments for the firm were too low to make such a plan practical, and that the firm was convinced that most of its shareholders wanted current income (ie., most stockholders would not be interested in participating in an ADR plan). Numerous other reasons were also given by the respondents. The most common was that the firm paid either little or no cash dividend. The second most common reason

TABLE XV
REASONS GIVEN FOR NOT
ESTABLISHING AN ADR PLAN

Response	First Choice	Second Choice	Third Choice	Fourth Choice
a Dollar volume of dividend payments are too low.	28	4	1	0
b Cost to the company would be too high.	6	5	5	1
c Cost to the shareholder would be too great.	3	2	2	1
d Our shareholders want current income.	33	4	1	1
e* Other.	27	4	0	0

*Most of the other reasons provided by respondents to the questionnaire were that the firm either paid little or no cash dividend, or that stockholders had expressed little or no demand for the service. Other reasons given were that ownership was concentrated or that institutional investors comprise a significant amount of the ownership of the firm and would not be interested in a reinvestment plan. Less common reasons given were timing, variability of earnings, and that ADR plans benefit only a fraction of the total number of shareholders.

given was that ownership was concentrated or that institution investors had a heavy interest in the firm. It was pointed out by several respondents that neither the large investor nor the institutional investor had shown much interest in this type of plan.

The object of the final question was to gauge the potential for future growth in ADR plans. The responses (presented in Table XVI) were categorized in regard to how question one was answered. Responses were also broken down with respect to whether the proposed plan deals only in outstanding issues or in new shares of common stock. It was hoped that this question, in particular, would provide information that would be useful in estimating the role that automatic dividend reinvestment plans may be expected to play in the future as well as provide some indication of the potential for future growth of both types of ADR plans. The information presented reveals that 47 out of the 124 responding firms expect to implement an ADR plan in the future if only outstanding common is used in the plan. Only 13 out of the 124 responding firms indicated that they would likely establish an ADR plan if new shares of common were purchased by that plan. The results indicate a potential for considerable growth for plans dealing in outstanding issues yet little acceptance of plans that deal in new issues of common.

Conclusions

Results of the questionnaire indicate that there is considerable potential for growth in the number of ADR plans and in the number of shareholders participating in existing ADR plans. While there has been some consideration given to plans that issue new shares of common stock

TABLE XVI

RESPONSES AS TO WHETHER OR NOT
IT WAS LIKELY THAT THE FIRM WOULD IMPLEMENT
AN ADR PLAN WITHIN 3 YEARS

If Only Outstanding Issues Are Used And Response To Question One Was:		Response		
		Yes	No	Uncertain
b	Considered and rejected	10	61	6
c-1	No decision made yet.	30	3	0
c-2	A plan will likely be established.	16	2	2
c-3	The establishment of a plan is unlikely.	<u>1</u>	<u>3</u>	<u>0</u>
Total		47	69	8
If New Shares Are Sold And Response To Question One Was:		Response		
		Yes	No	Uncertain
b	Considered and rejected.	2	67	2
c-1	No decision made yet.	3	18	1
c-2	A plan will likely be established.	7	8	2
c-3	The establishment of a plan is unlikely.	<u>1</u>	<u>3</u>	<u>0</u>
Total		13	106	5

rather than dealing exclusively in outstanding issues, few firms have indicated a willingness to include this highly innovative feature in their ADR plan. Also the greater majority of ADR plans will probably continue to be bank administered.

Reasons for implementing or not implementing an ADR plan were determined from the questionnaire. The most frequently cited reason for establishing an ADR plan was "to provide a service for those

shareholders who want to save and not use current dividend income for consumption." One other reason that was frequently cited was that ADR plans "encourage small shareholders to increase their ownership of the firm's stock." A few firms also felt that the plans might help "create a broader market for the firm's common stock." The reasons most frequently given for not establishing an ADR plan were that the "dollar volume of dividend payments were too low to make a plan practical" and "that the firm was convinced that their shareholders wanted current income and would not want to participate."

A majority of the financial executives also indicated that they did not feel that the firm's ADR experiences would influence the dividend policy of the firm.

CHAPTER VI

CHARACTERISTICS OF FIRMS WITH HIGH SHAREHOLDER PARTICIPATION

A financial executive who is considering an ADR plan for a firm should be concerned with more than the characteristics of ADR users (Chapter IV) and information on participation rates that have been experienced by other firms (Chapter V). What he actually should know is the kind of participation rate that his firm might expect. Information of this nature is necessary for potential adopters who question whether shareholder participation will be sufficiently high to justify the cost and time to implement an ADR plan. The purpose of this chapter is to provide financial executives with more information on shareholder participation.

The statistical technique employed in this chapter was multiple regression analysis. The objective of the statistical analysis was to differentiate between firms with high and low participation ratios.

Selection of Variables

Participation in ADR plans is quite likely to be a function of several factors. No doubt, investors are influenced by the cost to purchase shares through an ADR option, particularly in relation to purchase costs of other alternatives. In addition, the participation rate realized by any firm should be a function of how well the ADR option has been promoted by the firm. The age of the plan may be a determining factor. The premise here is that older plans are better

known to shareholders. Perhaps age and promotion are interwoven determinants. At any point in time, the participation rate may well be a function of prevailing market conditions. If the market is favorable more shareholders might be encouraged to utilize their purchase option than when the market is unfavorable. Finally, the participation rate should be a function of characteristics of a firm's shareholders as well as expectations of the firm's future performance. This chapter will give primary consideration to developing profiles that characterize firms with the highest shareholder participation in ADR plans. In doing so, it will be assumed that shareholder characteristics are reflected in the financial attributes of the firm. Secondary consideration will be given to the role that cost, promotion, market conditions and age of plans play in influencing shareholder participation.

Cost

Cost is an important consideration. This is particularly true as far as the tradeoff between using an ADR plan for reinvestment versus purchasing through a broker is concerned. While cost data were previously presented, it should be recalled that the total charges to purchase small amounts of stock are less expensive by route of the ADR option than through a broker. However, for larger purchases, the issue becomes quite complex and would require extensive comparisons with brokerage charges for different purchase quantities. Such an endeavor would be outside the focus of this study.

While cost is recognized as a determinant of shareholder participation, it seemed unwise to employ the cost data that were obtainable for the regression model. Several factors were responsible for this decision. Cost information was not obtained for all the firms in the

present regression model. The decision to include cost consideration would have further reduced the sample size. More important, there is little cost differential between the plans. In fact, 188 of the 235 nonfinancial firms on which cost information was obtained charge shareholders the same amount to participate. Charges for the majority of the 47 remaining firms differed only slightly. Consequently, it was felt that the charges for the majority of the ADR plans were so close that the differential between charges for a shareholder to participate and brokerage charges would not vary enough to be a significant factor in the model.

Promotion

The assumption is that the better promoted plans will realize greater shareholder participation. Unfortunately, figures on promotion budgets were unobtainable. Perhaps, more important, promotion expenses are likely to be correlated with the size of the firm. In addition, these expenses would necessarily need to be dealt with, in a dynamic context, since the effectiveness of promotion is not only a function of current expenditures but also a function of past expenditures. Thus, promotion might well be strongly correlated with age unless the effectiveness of ADR promotion expenditures is subjected to rapid decay. Finally, the effectiveness of any promotion campaign is a function of more than the dollar outlay for encouraging participation in ADR plans. These additional factors are very difficult to measure.

Age of Plans

Age could very well be an important determinant of the degree of participation that a particular firm is able to realize. It is also a

variable that should be considered in determining the promotion effect. However, there were several problems encountered in trying to incorporate the age of plans into the multiple regression model as an independent variable. The age differential for most plans is a matter of months since the majority of plans were established in 1972 or 1973. Furthermore, age may be correlated with financial variables such as the size of the firm. Since size variables were used in the discriminant analysis, the use of age would only encourage problems of multicollinearity. Finally, it was felt that age data could be interpreted without incorporating them into the multiple regression model.

Two methods for determining whether or not the age of ADR plans influenced participation were employed. First, the participation rates were compared in terms of when the plans were established. In order to have a sufficient number of observations, it was decided to compare data across years rather than by months. The only two years with enough observations to be reliable were 1972 and 1973. Computation of estimated data for 1973 from the questionnaire revealed that the average participation by percentage of shareholders for plans implemented in 1972 was 6.0 percent. The same average for plans established in 1973 was 5.9 percent. The respective sample sizes were 36 and 40. Estimates of participation for 1973 and 1974 were also compared. Data from the questionnaire were employed to determine if firms gave different estimates of participation in their responses for the two years. The average estimated participation by percentage of shareholders for 1973 was 6.1 percent. There were 87 firms in the sample. The same average computed from 1974 estimates for 79 firms was 7.1 percent. It would appear that the first approach was inconclusive in that the difference

between the 1973 estimate for plans implemented in 1972 and 1973 were minute. On the other hand, when estimated participation figures were compared for all firms on which information was available for 1973 and 1974 there was an abrupt increase. These results could reflect that a young movement may be gaining wider acceptance with age. It may, however, reflect optimism that financial executives had for market developments in 1974. Perhaps, the feeling may have prevailed that better stock performance in the coming year would increase participation.

Market Conditions

Little doubt should exist that there is a positive relationship between participating in an ADR plan and prevailing market conditions. As long as the market is in an upswing, investors may find added encouragement to reinvest dividends. The major difficulty with incorporating this factor into the regression model is that the effect is a time series problem while the regression model deals with cross-sectorial data. Consequently, the profiles to be established by the regression model reflect market conditions that were prevailing at a particular time. Stock market conditions may have a pronounced effect upon the type of firm realizing the highest shareholder participation. Unfortunately, a study of the market effect would require extensive data of a time series nature that are not available because of the youth of the ADR movement. Extensive data reflecting different market conditions may not be available for several years.

Shareholder Characteristics

The participation rate is, no doubt, influenced greatly by characteristics of the firm's shareholders. Such traits as wealth, income

preferences, attitude toward risk, age, diversification, etc. may well have a bearing upon an investor's behavior. Many of these traits are difficult to measure and some of the data were simply unavailable. Therefore, the decision was made to use relevant financial variables as surrogates for characteristics of the stockholder. Linked with the decision is an acceptance of the "rationality" assumption of M&M as well as their "clienteles theory." That is, investors are assumed to behave rationally in choosing common stock that conforms to their preferences. The preferences are further assumed to reflect the characteristics of the investor.

Ten independent variables, considered to be representative of the financial characteristics of the firm, were used. The independent variables used were identical to the variables used in the multiple discriminant model except for the omission of the industry utilization factor. Six categories (return, market performance, growth, solvency, size, and dividend policy) were included in the regression model. Two different measures of participation from the questionnaire were employed as dependent variables with the ten independent variables. Thus two equations were developed for the industrial firms and two equations for the utilities.

The Samples

Out of the population of 425 industrial firms and 55 public utilities, 72 industrials and 26 utilities were identified as ADR users and had sufficient data available to compute the independent variables for the multiple regression model. An additional reduction in sample size resulted from the use of response information from the

questionnaire on estimated participation rates as the dependent variables. Therefore, only those firms that had sufficient information from the Compustat Tapes and provided an estimate of the participation in ADR plans for 1973 were used in the regression model. Since two measures of the dependent variable were available from the questionnaire, two multiple regression equations were fitted to both the industrial firms and the public utilities. When the participation rate (dependent variable) used was percentage of shareholders, 34 industrials and 15 utilities comprised the samples. When the dependent variable was the percentage of outstanding shares participating, 28 industrials and 15 utilities made up the sample.

Selection of Best Equations

The procedure followed was to determine the equation in each of the four cases with the highest coefficient of determination adjusted for degrees of freedom. Several other considerations were, however, predominant. Only one size variable was allowed in the final equation as well as only one growth variable. In the case of the utilities the weighted yield relative and the return on book value were not allowed in the same final equation. The resulting equations did not violate any of the above considerations and had the highest coefficient of determination adjusted for degrees of freedom of any feasible combination of variables. It is admitted that an element of "ad hocery" is present here. Nevertheless, it is true that the selection of feasible variables received strong a priori considerations and are substantiated in the financial literature as those which should receive consideration in the investment decision-making process.

Empirical Findings of the Multiple Regression Model

Tables XVII and XVIII contain the coefficients and t statistics for the variables included in the regression equations for industrial firms. The respective dependent variables were the percentage of shareholders participating and the percentage of outstanding shares participating. The equation in Table XVII contains 7 variables and 26 degrees of freedom remaining. The coefficient of determination adjusted for degrees of freedom was .5337. Thus 53.37 percent of the variance was explained by the regression equation. The price earnings

TABLE XVII

REGRESSION COEFFICIENTS AND t STATISTICS
IN THE FINAL EQUATION FOR 34 INDUSTRIAL FIRMS WHEN THE DEPENDENT
VARIABLE WAS THE PERCENTAGE OF SHAREHOLDERS PARTICIPATING

Variable	Regression Coefficient	t Statistic
Weighted Average Yield	-2.26	-1.09
Average Price Earnings Ratio*	0.08	2.29
Growth (Arithmetic Mean)	12.75	1.99
Current Ratio	-0.44	-1.35
Debt Over Net Worth*	-2.64	-2.73
Number of Shareholders*	0.01	2.88
Average Dividend Payout Ratio*	-0.05	-2.33
Constant	-1.77	-0.27

Degrees of freedom 26

R^2 adjusted for degrees of freedom ($\bar{R}^2$) .5337

*Denotes variable with t statistic significant at the .05 level.
Critical value for t is 2.056.

ratio, debt to net worth, number of shareholders outstanding, and the average dividend payout ratio had significant t statistics. The equation in Table XVIII contains 4 variables and has 23 degrees of freedom remaining. The coefficient of determination adjusted for degrees of freedom was .3628. The arithmetic growth rate in EPS, total dollar dividends and the average dividend payout ratio had statistically significant t values. A size variable (the number of shareholders in Table XVIII and total dollar dividends in Table XVII) and the average dividend payout ratio were statistically significant in both equations for industrial firms.

TABLE XVIII

REGRESSION COEFFICIENTS AND t STATISTICS
IN THE FINAL EQUATION FOR 28 INDUSTRIAL FIRMS WHEN THE DEPENDENT
VARIABLE WAS THE PERCENTAGE OF SHARES PARTICIPATING

Variable	Regression Coefficient	t Statistic
Weighted Average Yield	-1.66	-2.04
Growth (Arithmetic Mean)*	5.64	2.34
Total Dollar Dividends*	0.00**	2.39
Average Dividend Payout Ratio*	-0.02	-2.14
Constant	-2.02	-0.77

Degrees of freedom 23

R^2 adjusted for degrees of freedom ($\bar{R}^2$) .3628

*Denotes variable with t statistic significant at the .05 level.
Critical value for t is 2.074.

**Value of coefficient is 0.0008.

TABLE XIX

PARTIAL CORRELATION MATRIX FOR VARIABLES IN THE FINAL EQUATIONS
FOR INDUSTRIAL FIRMS WITH COEFFICIENTS OF CORRELATION GREATER
THAN 30 PERCENT

<u>Percent of Shareholders for 34 Industrials (Table XVII)</u>		<u>Coefficient of Correlation</u>
Growth (Arithmetic Mean)	Average Dividend Payout Ratio	-.51
Weighted Average Yield	Average PE Ratio	.49
Weighted Average Yield	Growth (Arithmetic Mean)	.46
Debt Over Net Worth	Number of Shareholders	-.36
Current Ratio	Number of Shareholders	-.31
<u>Percent of Shares Outstanding for 28 Industrials (Table XVIII)</u>		
Growth (Arithmetic Mean)	Average Dividend Payout Ratio	-.49
Weighted Average Yield	Growth (Arithmetic Mean)	.42

A partial correlation coefficient matrix is presented in Table XIX. Only the coefficients of correlation for variables in the final equation greater than 30 percent are included in the table. There does appear to be some possibility that multicollinearity exists.

Equations were also fitted to the financial variables for 15 utilities. Once again the dependent variables were the participation responses from the questionnaire. The results are presented in Table XX and Table XXI. The respective coefficients of determination adjusted for degrees of freedom were .7285 and .3624. Only return on book value was statistically significant when percentage of shareholders was the participation measure used. The average dividend payout ratio was significant when the dependent variable was the percentage of outstanding shares.

TABLE XX

REGRESSION COEFFICIENTS AND t STATISTICS
IN THE FINAL EQUATION FOR 15 UTILITIES WHEN THE DEPENDENT
VARIABLE WAS THE PERCENTAGE OF SHAREHOLDERS PARTICIPATING

Variable	Regression Coefficient	t Statistic
Average Price Earnings Ratio	0.33	1.66
Growth (Geometric Mean)	56.64	2.16
Return on Book Value*	-15.14	-4.88
Total Assets	-0.11	-2.06
Average Dividend Payout Ratio	-0.11	-1.40
Constant	-35.00	-1.11

Degrees of freedom 9

R^2 adjusted for degrees of freedom ($\bar{R}^2$) .7285

*Denotes variable with t statistic significant at the .05 level.
Critical value for t is 2.262.

TABLE XXI

REGRESSION COEFFICIENTS AND t STATISTICS
IN THE FINAL EQUATION FOR 15 UTILITIES WHEN THE DEPENDENT
VARIABLE WAS THE PERCENTAGE OF SHARES PARTICIPATING

Variable	Regression Coefficient	t Statistic
Total Assets	0.04	1.94
Average Dividend Payout Ratio*	-0.11	-2.51
Constant	-6.34	-2.10

Degrees of freedom 12

R^2 adjusted for degrees of freedom ($\bar{R}^2$) .3624

*Denotes variable with t statistic significant at the .05 level.
Critical value for t is 2.179.

A partial correlation coefficient matrix for the independent variables in the first equation for the utilities is presented in Table XXII. The second equation for the utilities was not included as it contained two independent variables. Consequently, only one coefficient of correlation exists. When the dependent variable was the percent of shares outstanding, the correlation coefficient between total assets and the average dividend payout ratio was .01. Therefore, multicollinearity should not be a problem in this utility equation. The probability of this type of statistical problem would seem to be much stronger when the dependent variable is the percent of shareholders.

The sign of the correlation coefficient, R , between the geometric growth rate and the average price earnings ratio is puzzling. One would expect high growth firms to command a high market price in relation to earnings; therefore, the PE ratio should be positive. However, it should be recalled that the correlation coefficient calculations are drawn from a subset of the S&P 425 or the 55 utilities. Interpretation of all correlation coefficients should take this into account. In addition, this coefficient is from a sample of 15 firms and its behavior may reflect the fact that it is drawn from a small sample. Finally, it should be remembered that an R of .70 yields an R^2 of .49. This is an indication that only 49 percent of the variation of one of the variables is explained by other.

Problems and Limitations

Several difficulties of a statistical nature were encountered in the multiple regression model. In the two regression equations for the utilities the sample sizes were small. In hypothesis testing the

TABLE XXII

PARTIAL CORRELATION MATRIX FOR VARIABLES IN THE FINAL EQUATION
FOR PUBLIC UTILITIES WITH COEFFICIENTS OF CORRELATION GREATER
THAN 30 PERCENT

<u>Percent of Shareholders for 15 Utilities (Table XX)</u>		<u>Coefficient of Correlation</u>
Average PE Ratio	Growth (Geometric Mean)	-.68
Growth (Geometric Mean)	Total Assets	-.60
Return on Book Value	Total Assets	-.59
Growth (Geometric Mean)	Return on Book Value	.58
Average PE Ratio	Return on Book Value	-.51
Average PE Ratio	Average Dividend Payout Ratio	.45
Growth (Geometric Mean)	Average Dividend Payout Ratio	-.38

t distribution takes account of the fact that a small sample was used because the critical value of t is affected by the number of degrees of freedom. However, there is a stronger probability that specification bias may result from using small rather than large samples. This is true because variables may be excluded from the final equation which might have been included if the sample size had been larger.

Additionally, the dependent variables were taken from the questionnaire and were only "best estimates" by the firm executive who responded. Consequently, errors in the dependent variable do exist. In large samples the problems caused by such errors is not likely to be great due to the fact that errors in the estimate are quite likely to offset each other. However, in small samples one very poor estimate may have an adverse effect upon the accuracy of the regression equation.

Other statistical problems of primary concern are the possibility of specification bias and multicollinearity. For instance, concern still existed over the possibility of specification bias due to the omission of a risk variable such as the beta coefficient. Also multicollinearity may be in some of the equations. While none of the coefficients of correlation in any of the equations are very high, there are a few around .5. This is an indication that some degree of multicollinearity may exist. The probability appears to be particularly strong for the utility equation with percentage of shareholders as the dependent variable. Apparently the only equation in which it can be safely said that no multicollinearity exists is the utility equation with the percentage of outstanding shares participating as the dependent variable.

Conclusions

An indirect approach was taken to the problem of determining shareholders' preferences. The decision was made to use financial characteristics of the firm as a surrogate for characteristics which might denote the type of shareholder who was participating in an ADR plan. The assumption is, therefore, closely akin to the "clienteles theory" in that shareholders with particular characteristics are expected to invest in firms that fulfill those requirements most adequately. Also, imbedded in the indirect approach is an assumption of "rationality" in that investors' behavior is rational in the selection of the particular mix of return, risk, and income timing which maximizes some utility function. Actually, it is not necessary that each shareholder acts entirely rational. Since the dependent

variable aggregates the behavior of the shareholders in a firm, the error of a few shareholders acting in an irrational manner is minimized. Therefore, as long as the majority of the firm's shareholders behave rationally, the study should be of some merit.

The preferences of investors in industrial firms and utilities will now be reviewed. Equations developed for each of the two investor classifications will be discussed in terms of reliability and usefulness.

Deciding which of the two equations to use is rather difficult to resolve. In terms of the coefficient of determination the equation with the percentage of shareholders as the dependent variable is superior. From the executives' point of view, the appropriate equation to use would seem to depend upon whether financial decisions are made to satisfy the greatest number of shareholders or the largest block of outstanding shares. As for inferences to the matter of dividend policy and valuation, equations which use the percentage of shareholders participating should be preferred in that large investors and institutional investors' positions in a stock would have a less dramatic effect upon the dependent variable. One additional aspect also would seem to merit consideration in the equations for the utilities. Perhaps the statistical shortcomings of one equation are greater than the other. Unfortunately, the statistical reliability of the two equations is not so easy to judge. In terms of multicollinearity the equation with percentage of shareholders participating as the dependent variable seems to be at quite a disadvantage. Whether or not the other equation suffers more from problems of specification bias to offset this disadvantage remains uncertain. At least, the existence of specifica-

tion bias is without empirical support while there is some evidence of multicollinearity when the percentage of shareholders participating is used as the dependent variable. Consequently, available evidence would seem to indicate that this equation may suffer from more serious statistical problems.

Utility Investors

Preferences of utility investors were not easy to interpret. Most of the difficulties resulted from the fact that a small sample was used and from the possibility that problems of multicollinearity may have been prevalent. In addition, a different variable was found to have a statistically significant t in each of the equations. In the regression equation with percentage of shareholders participating as the dependent variable, return on book value was found to have a negative sign. When the dependent variable was percentage of outstanding shares participating, the average dividend payout ratio had a negative sign. The negative sign for the payout ratio was consistent with the preferences of industrial investors. While the negative sign for book value was puzzling, a comparable return variable for industrial investors (the weighted average yield) had a negative sign although it was not statistically significant in any of the equations.

Industrial Investors

The industrial investor, in terms of the percent of participating shareholders, would seem to prefer firms with high price earnings ratios, low ratios of debt to net worth, large firms (in terms of the number of shareholders) and low dividend payout ratios. One difference in the conclusion reached in the two equations for industrial firms is

that the size variables are not the same. Yet it should probably be argued that the correlation between the size variables is so high that any of the three would hardly sacrifice much in predictive power. The coefficients of correlation for the three size variables for 34 firms were .91, .93 and .90. Therefore, it is not surprising that the two different measures for the dependent variable would result in a change in the best size variable in terms of predictive ability. Two variables (i.e., the average price earnings ratio and the arithmetic rate of growth in EPS) were statistically significant in both equations for industrial firms.

CHAPTER VII

THEORETICAL IMPLICATIONS

Many of the early dividend theory models, such as those of M&M and Gordon, were developed in a pre-tax world. In a world with no taxes, no brokerage costs, perfect information, etc., M&M reached the conclusion that dividend policy is irrelevant. They later conceded that, in a world of taxes, the differential between the tax rates applicable to dividends and capital gains should lead to a preference for earnings retentions over dividends because of the lower tax rate applicable to capital gains. Gordon's conclusion in a pre-tax world was that investors value dividends more than capital gains. Perhaps, the most crucial assumption in the Gordon model was that the discount rate investors apply to cash flows increases with time.

In search of a resolution to the conflict, several regression models were developed to test for the statistical significance of dividends and earnings in multiple regression equations. The findings of the majority of these supported the Gordon position that dividends were a more important determinant of value than earnings. However, many of these models later appeared to have suffered from statistical problems and may have yielded erroneous conclusions.

A second group of seemingly diverse empirical studies also evolved. Most of these studies dealt with the application of dividend theory to the after-tax world and seemed concerned over the role of taxes, the existence of clienteles, and the assumption of rational investor behavior. Elton and Gruber, Weston and Brigham, Holland, and

Jolivet estimated the marginal tax rates of investors. While differences existed in their estimates, the important finding in all these studies was that the marginal tax rate of the average investor is greater than the capital gains rate. Elton and Gruber also provided empirical substantiation for the "clienteles theory" and the assumption of investor "rationality" by showing that shareholders in the higher income brackets preferred capital gains to dividend income.

While the Gordon and M&M models were predominantly occupied with a pre-tax world, this study deals only with an after-tax world. As in the Elton and Gruber study, the "clienteles theory" and the assumption of "rationality" are of primary concern. In particular, an effort will be made to answer the two following questions: Is the decision by an investor to participate in an ADR plan an irrational act? Does the existence of ADR plans constitute empirical evidence that the "clienteles theory" is not applicable to the real world?

Rationality

Is the behavior of ADR participants consistent with maximization of investors' wealth? In other words, is the decision to participate an action that is the most effective channel of reinvestment for a participant? If it is assumed that investment in a particular stock is logical, the decision to purchase through an ADR option may be rational. Brokerage costs that may be incurred if shares are purchased directly are likely to be greater for small purchases. Therefore, a rational investor would be interested in minimizing the cost for a given investment and would logically choose ADR reinvestment in preference to purchase from a broker.

The question then arises as to whether the purchase of that particular stock is a rational decision that would maximize an investor's wealth. The position taken on this issue by Friend and Puckett in their 1964 article was as follows:

The fact that investors are willing to hold (or buy) a company's shares at the prevailing price implies that the rate of discount which equates their income expectations with market price constitutes a rate of return at least as high as could be obtained in alternative investments of comparable risk. Now, if these investors are willing to increase their holdings of shares at the same rate of market return, they should also be willing to forego current dividends insofar as the added equity investment yields this rate. Stated another way, investors should be indifferent if the present value of the additional future returns resulting from earnings retention equals the amount of dividends foregone. Moreover, because increases in present value (market price) are realizable as capital gains, earnings retention carries a tax advantage that lowers the rate of return on corporate investment necessary for shareholder indifference between current dividends and earnings retention.¹

Friend and Puckett imply that a shareholder's decisions to reinvest dividends is suboptimal because an investor would be better off if his earnings were retained rather than paid out as dividends. Inherent in their conclusion is an assumption that the returns which would be realized on incremental investments are at least as great as the marginal cost of capital. Friend and Puckett assumed, like Gordon, that the discount rate, k , is equal to the rate of return that the firm can realize from additional investments. On a before-tax basis the present value of the returns generated from the reinvestment of retained earnings is equal to any dividend that was foregone. However, on an after-tax basis, the present value of the returns must be greater because the tax rate on capital gains is lower than the tax rate on regular income.

¹Irwin Friend and Marshall Puckett, "Dividends and Stock Prices," American Economic Review, LIV (September, 1964), p. 657.

This analogy should hold as long as the decision by the firm to change its dividend policy does not influence the risk-return characteristics of the firm. Gordon, for instance, would contend that the decision to reduce the dividend payout ratio would cause investors to discount the cash flows from the investment at a higher rate. He contends that a higher discount rate should be applicable since there was a delay in the receipt of cash flows by shareholders. The return characteristics might be altered if the decision to lower the dividend payout ratio resulted in a reduction in the return that the firm could expect to receive on investments financed by the additional earnings retention.

The pros and cons for participating in an ADR plan parallel those for buying stock. The one possible exception is that purchasing costs are likely to be slightly less under ADR plans; otherwise, funds reinvested through ADR plans are taxable at the same rate that regular dividends are. Likewise, an investor who is participating in an ADR plan should normally be better off if his dividends are retained and reinvested by the firm. By allowing the firm to retain rather than pay out its earnings, the investor would be subjecting himself to the lower tax rate applicable to capital gains.

Investors who are participating in ADR plans have made a decision which is comparable to the purchase of stock. Is it certain that they would be better off if the firm, in fact, reduced its dividend payout ratio?

As long as an ADR plan deals only in outstanding issues, the reinvestment of a dividend by a shareholder of the firm does not directly influence capital expenditures; hence, the marginal rate of return on

investment to the firm is undisturbed. Plans dealing in outstanding issues may indirectly influence capital budgeting if they have an effect upon the firm's cost of capital. There would appear to be two ways that ADR plans might influence the cost of capital. One is that the generation of additional interest and buying pressure may lower the firm's cost of capital. Secondly, ADR plans may influence the variability of the market for the firm's stock. Reduction in share price fluctuations would likely reduce the cost of capital; an increase should have the opposite effect. A change in the firm's cost of capital may result in a movement along its marginal efficiency of capital schedule and could effect its capital budgeting decisions. While it is possible that an ADR plan dealing in outstanding issues may influence the firm's cost of capital, this influence has yet to be verified empirically. However, the decision to withhold dividends and invest the retention of earnings in the capital budgeting framework is likely to result in a lower return on incremental investment as the firm moves along its downward sloping marginal efficiency of capital schedule. The reduction in the return realized by the firm may be enough to offset the tax advantages that would otherwise accrue to shareholders if the firm paid no dividends.

On the surface, it would appear that the decision to participate in an ADR plan and a zero payout ratio accomplish the same objective, reinvestment of earnings. It would also seem apparent that both are equally risky. However, the decision to participate in an ADR plan and a zero payout ratio may not be equivalent in terms of the risk involved. The truth is that an ADR participant can receive dividends again with little or no delay. On the other hand, a shareholder in a

firm that retains all of its earnings does not have a comparable option. His only alternative is to sell some of his stock. In a depressed market the decision to sell may prove quite costly.

Participating in ADR plans may also afford an efficient means for an investor to buy into or sell out of a particular stock. For instance, in some plans it is possible for an investor wishing to buy into a firm's stock over time, to do it economically as a participant in an ADR plan. Upon joining an ADR plan the cash contribution feature of that plan is available to the investor. In most plans the investor will be able to contribute from \$500 to \$1000 per dividend period (the most common dividend period is quarterly). Purchasing costs under the cash contribution feature for the majority of the plans are at the same low rates as for the reinvested dividends. Any shares that were acquired under an ADR plan, either from the reinvestment of dividends or from the cash contribution feature, may be disposed of under the plan at rates that often are almost negligible.

Finally, the decision to participate in an ADR plan may reflect an attempt on the part of some investors to save. These plans may thus be viewed as a forced savings plan serving to prevent a shareholder from spending dividends that he would, otherwise, receive.

In addition, a particular investor is not likely to be able to influence the dividend policy of the firm. Consequently, an investor preferring capital gains must invest in another firm. It has also been assumed that an investor can find a comparable firm elsewhere with identical risk-return characteristics and a lower payout ratio. Unless such firms exist, it is not clear that ADR participation is irrational in every case.

Clientele Theory

Miller and Modigliani's "clienteles theory" contends that investors, because of the existence of brokerage charges, etc., may be inclined to purchase stock in firms whose dividend payout ratios matched their income-capital gains preferences. Consequently, investors preferring dividends for current consumption would tend to invest in firms with a high dividend payout ratio and investors preferring capital gains would invest in growth firms which are characterized by low payout ratios. It would seem that the decision of an investor to participate in an automatic dividend reinvestment plan is inconsistent with the "clienteles theory" and that participating shareholders would be better off in a comparable firm that pays little or no dividends.

In this sense it appears that the assumption of "rationality" and the "clienteles theory" are interwoven. Forces in the market such as taxes and brokerage charges, in particular, necessitate that an investor adhere to the "clienteles theory" if his behavior is to be construed as rational.

In fact, the multiple regression model in Chapter VI was actually a test of the "clienteles theory" and the Assumption of "rationality" as well. Variables in five categories (return, market performance, growth, solvency and dividend policy) were assumed to reflect the preferences of participating shareholders. The data appeared to indicate that participation was a function of the average PE ratio (positive), debt over net worth (negative) and the average dividend payout ratio (negative). While the model may have suffered from problems of specification bias such as the omission of the beta coefficient as an appropriate risk variable, the results did not appear to be inconsistent with

the "clienteles theory." A preference for higher dividends would have been inconsistent with the "clienteles theory." Perhaps, investors who were unable to find the same risk-return characteristics in a firm with a lower dividend payout ratio, became ADR participants. If so, their decision can not be construed to be irrational. It seems probable that participants in ADR plans are not after current income. It also seems logical that participation rates would be higher for firms with characteristics reflecting growth (such as higher PE ratios and lower payout ratios).

Conclusions

Most of the research that has been published on the importance or unimportance of dividends in the real world has treated the role played by taxes quite generally. Inferences which were made focused on the differential between the marginal tax rates for ordinary income and capital gains. Miller and Modigliani, for example, contended that investors should prefer retention of earnings to dividends because of the tax advantages that exist. Holland, Jolivet and others even attempted to determine the average marginal tax rate on ordinary income. The Elton and Gruber study was one of the few that concentrated upon specific tax rates applicable to an individual investor. Their findings supported the "clienteles theory" and the assumption of "rationality" in that investors with high marginal tax rates were shown to favor capital gains over dividend income. Since marginal tax rates for investors were not available, Elton and Gruber found it necessary to use a surrogate.

Empirical findings from the regression model (Chapter VI) parallel

the Elton and Gruber study. Investors participating in ADR plans were assumed to be expressing a preference for income from capital gains over dividend income. The regression model provided some support for the "clienteles theory" in that the dividend payout ratio was found to have a negative sign. Participation was also higher in firms which displayed the greatest growth potential (low dividend payout and high PE ratio).

There were no indications that strongly refuted the assumption of "rationality" other than the fact that the decision to participate may be inconsistent with wealth maximization. It was further pointed out that under certain situations the decision to participate may be a rational act. ADR plans offer certain advantages in their cash contribution feature which are rather unique. Secondly, a comparable firm in terms of risk-return considerations may not exist. Unless such a firm exists, the decision to participate may be rational and investors may be adhering to the "clienteles theory" in so far as it is feasible for them to do so. In addition, it should be remembered that the majority of the shareholders, of all firms with established automatic dividend reinvestment plans, are not participants.

CHAPTER VIII

SUMMARY

The ADR movement has proven to be a rapid and recent innovation in finance. Since 1968, 265 nonfinancial institutions have established ADR plans for the primary purpose of providing a service to shareholders. Secondary considerations were also given to encouraging smaller shareholders to increase their share of ownership in the firm and to broadening the market for the common stock of the firm. Questionnaire responses indicated that there is considerable potential for future growth. In fact, unless unforeseen developments take place to slow down the movement, future growth seems highly probable and may even sustain the high growth rate of 1972 and 1973.

Most of the existing plans were determined to be bank managed and deal only in outstanding issues of the common stock of that particular firm. While a few plans are firm managed and/or deal in new issues of common stock, acceptance of these features does not appear to be widespread at present. One constraint to the future development of such features would also appear to exist. Registration with the Securities and Exchange Commission is required when new issues of common stock are employed and when there is an "affiliate relationship" between the administrator of an ADR plan and the firm.

Collection of Information

The identification of firms that were users and nonusers and the generation of information on cost and mechanics of ADR plans

necessitated the collection of data from diverse sources. Identification of most of the user firms and considerable cost information was supplied by Fortune's Fifty Largest Commercial Banks. Individual correspondence with the firms was the primary means for gathering information on mechanics. Considerable data on cost and mechanics were also taken from plan solicitations and annual shareholder reports. In addition, a questionnaire survey was conducted of the Standard and Poor 500. Data from the bank survey and questionnaire were then analyzed in order to provide information which might aid financial executives in deciding whether or not a firm could benefit from implementing an ADR plan. Finally, data from the Compustat Tapes were employed to develop profiles of firms that had established ADR plans and to ascertain characteristics of firms with high shareholder participation. A test for statistical difference between two sample means and multiple discriminant analysis were employed to develop profiles of ADR users. Multiple regression analysis was utilized to characterize firms with high shareholder participation.

Profiles of ADR Users

Both the test for statistical difference in sample means and MDA indicated that the industry utilization factor and the average price earnings ratios were meaningful discriminatory variables between users and nonusers. ADR users tended to have a higher utilization ratio and a lower average price earnings ratio. The statistical test for the difference between two sample means also indicated that users have a higher dividend payout ratio, lower financial leverage (debt over net worth) and lower earnings growth (arithmetic mean). Indica-

tions are that the typical firm with an established ADR plan is a low growth (low arithmetic mean, high payout and low price earnings ratio) firm. The fact that debt to net worth is low may also be an indication that the typical ADR firm is not highly risky. Perhaps, the firms that use ADR plans tend to be those which operate with lower risk and lower returns than nonADR firms.

Characteristics of Firms with High Shareholder Participation

Two measures of shareholder participation were obtained from response data to the questionnaire survey. These measures of stockholder participation became dependent variables in the multiple regression model. Characteristics of firms with high shareholder participation were ascertained by regressing financial characteristics of the firm against the two measures of the dependent variable.

Shareholder preferences, as measured by the percentage of stockholders participating, seemed to favor firms which emphasized growth (i.e., low dividend payout ratio, high average price earnings ratio), were large (i.e., greater number of outstanding shareholders) and had little risk (i.e., low ratio of debt to net worth). The use of percentage of shares outstanding as the dependent variable gave approximately the same description; shareholders appeared to prefer firms with high growth characteristics (i.e., low dividend payout ratio, high arithmetic rate of growth in EPS) and large firms (i.e., large total dollar dividends). In terms of the population of firms offering ADR plans, the shareholders' preferences seemed logical in that they chose the firms belonging to that population with highest growth potential and largest size.

Applicability to the Theory of Dividends

One application of findings from the ADR experience to dividend theory parallels the Friend and Puckett argument. Their argument was that investors who elect to reinvest dividends should be willing to forego dividends. By electing to have the firm retain earnings instead of paying them out as dividends, investors avoid the higher tax rates that are applicable to dividend income in favor of the lower tax rate applicable to capital gains. Their argument would also seem applicable to participants in automatic dividend reinvestment plans. ADR participants have already made a commitment to reinvest and dividends can more effectively be reinvested by having the firm retain earnings rather than pay them out in the first place. Conflicting arguments were that a reduction in the payout ratio may alter the risk-return characteristics of the firm and investors may realize advantages enabling them to efficiently purchase and sell shares if they are participants.

A second line of inference is the possibility of relating the behavior of participating investors to the assumptions of investor "rationality," and the "clienteles theory" by Miller and Modigliani. It would seem that the decision of investors to participate in ADR plans is inconsistent with either. On the surface it appears that the decision to participate in a plan is a vote by that investor for capital gains preference. In that case the participating investors would be better off in a comparable firm that pays little or no dividends because of the tax advantage. If a comparable firm with identical risk-return characteristics and a lower dividend payout

ratio does not exist, an investor preferring capital gains may find it necessary to compromise his income-timing objectives. Empirical evidence from the regression model revealed that ADR participants showed a preference for firms with a low dividend payout ratio. This evidence was construed to support the notion that investor behavior was rational and that a clientele effect may be present in the real world.

Suggestions for Further Research

Additional research may be able to improve the predictive power of similar regression and discriminant models. For instance, variables may be added or redefined. Different functional relationships may be employed. Furthermore, a study of profiles of ADR users and nonusers at different times in the ADR movement may yield useful information. Some interesting questions also were raised by this study which remain unresolved. Do these plans have any effect upon the cost of capital to the firm? What are the implications of automatic dividend reinvestment plans for an efficient market? Do ADR plans act as a stabilizing force in support of the market price of the firm's stock? Are there any possible long-run implications for the brokerage industry? How will varying market conditions influence shareholder participation? These areas would seem to contain much potential and merit for future research. It is hopeful that this study will provide some of the information needed to establish a foundation which can be used in further research.

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BIOGRAPHICAL SKETCH

Rodney Phil Malone was born in Albertville, Alabama, on February 28, 1946. His secondary school education was completed in June, 1964 at Dalton High School, Dalton, Georgia. He attended Berry College, Mt. Berry, Georgia where he graduated summa cum laude in June, 1968 with a Bachelor of Science degree in Business Administration.

He entered the University of Florida in June, 1968. In August, 1968, he was drafted by the United States Army in which he served as a Chaplain's Assistant until his tour of duty ended in June, 1970. He was subsequently readmitted to the doctoral program in economics and business administration at the University of Florida with an NDEA Title IV Fellowship.

In August, 1973 he assumed a position as assistant professor of economics and finance at the University of Mississippi. He graduated from the University of Florida in August, 1974.

Rodney Phil Malone is married and has no children.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Richard H. Pettway, Chairman
Associate Professor of Finance

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Eugene F. Brigham
Graduate Research Professor of
Finance

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Warren W. Menke
Associate Professor of Management

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Jack R. Vernon
Professor of Economics

This dissertation was submitted to the Department of Finance, Insurance, Real Estate and Urban Land Studies in the College of Business Administration and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1974

Dean, Graduate School